

=> d his
(FILE 'USPAT' ENTERED AT 15:21:58 ON 04 OCT 96)
L1 7700 S MOLECULAR(W)WEIGHT?(W)DISTRIBUTION?
L2 22 S L1 AND 210/198.2/CCLST
L3 1 S 5354852/PN
L4 0 S L1 AND L3
L5 28 S L1 AND 210/656-659/CCLST
L6 28 S L5 NOT L3
L7 12 S L5 NOT L2
L8 20 S L1 AND 210/635/CCLST
L9 15 S L8 NOT L7
L10 4 S L9 NOT L2
L11 88 S L1 AND 536/CLAS
L12 69 S L11 AND CHROMATOGRA?
L13 904350 S SUPPORT?
L14 20 S L11 AND L13
L15 1682 S SEPARAT?(A)AGENT?
L16 6 S L11 AND L15

=> s molecular(w) weight? (w) distribution?

215615 MOLECULAR
702880 WEIGHT?

256604 DISTRIBUTION?

L1 7700 MOLECULAR(W) WEIGHT? (W) DISTRIBUTION?

=> s l1 and 210/198.2/cclst

1133 210/198.2/CCLST

L2 22 L1 AND 210/198.2/CCLST

=> d 1-22

1. 5,431,807, Jul. 11, 1995, Multimodal chromatographic separation media and process for using same; Jean M. J. Frechet, et al., **210/198.2**, 502.1, 635, 656; 502/401, 402, 404 [IMAGE AVAILABLE]

2. 5,376,277, Dec. 27, 1994, Multidimensional chromatographic system; Hernan J. Cortes, et al., 210/659; 95/86, 87; **210/198.2**, 656; 436/155, 161 [IMAGE AVAILABLE]

3. 5,372,721, Dec. 13, 1994, Size separation of particles contained within a material by the use of nonaqueous hydrodynamic chromatography; Martin A. Langhorst, et al., 210/635; 209/1, 155, 209; **210/198.2**, 656, 659 [IMAGE AVAILABLE]

4. 5,316,680, May 31, 1994, Multimodal chromatographic separation media and process for using same; Jean M. J. Frechet, et al., 210/635, **198.2**, 502.1, 656; 502/401, 402, 404; 530/413, 417 [IMAGE AVAILABLE]

5. RE 34,457, Nov. 30, 1993, Separating agent; Yoshio Okamoto, et al. **210/198.2**, 502.1, 635, 656; 502/404; 536/63, 64 [IMAGE AVAILABLE] 

6. 5,240,604, Aug. 31, 1993, Multidimensional chromatographic system; Hernan J. Cortes, et al., **210/198.2**; 96/101; 210/656, 659; 422/70, 78, 80, 89 [IMAGE AVAILABLE]

7. 5,190,658, Mar. 2, 1993, Method for size exclusion chromatography; Lev Z. Vilenchik, et al., 210/656, **198.2**, 635; 530/417 [IMAGE AVAILABLE]

8. 5,183,604, Feb. 2, 1993, Size separation of particles contained within a material by the use of nonaqueous hydrodynamic chromatography; Martin A. Langhorst, et al., 264/40.1; 209/1, 155, 209; **210/198.2**, 656, 659; 264/236, 347 [IMAGE AVAILABLE]

9. 5,080,798, Jan. 14, 1992, Monitoring oligomers in a polymer; David E. James, 210/656; 73/61.52; **210/198.2**, 635; 264/184 [IMAGE AVAILABLE]

10. 4,992,168, Feb. 12, 1991, Apparatus for fractionally measuring polymers; Shigeru Takayama, et al., **210/198.2**; 73/61.43, 64.54; 210/101, 656; 422/70 [IMAGE AVAILABLE]

11. 4,983,528, Jan. 8, 1991, Measurement of unsaturation level in butyl and EPDM rubbers; Dennis A. Loucks, 436/141; 73/61.52; **210/198.2**, 656; 422/70; 436/85, 142, 161 [IMAGE AVAILABLE] 

12. 4,846,968, Jul. 11, 1989, Resolving agent; Yoichi Yuki, et al.,

210/198.2, 502.1; 502/404 [IMAGE AVAILABLE]

13. 4,818,394, Apr. 4, 1989, Separating agent; Yoshio Okamoto, et al.,
210/198.2, 502.1, 635, 656; 502/404; 536/63, 64 [IMAGE AVAILABLE] 

14. 4,786,416, Nov. 22, 1988, Resolving agent; Yoichi Yuki, et al.,
210/635, **198.2**, 502.1, 656 [IMAGE AVAILABLE] 

15. 4,694,682, Sep. 22, 1987, Analysis of organic additives in plating
baths using novel chromatographic methods in a mass balance approach;
Kurt E. Heikkila, et al., 73/61.53, 61.55; **210/198.2**, 656; 422/70
[IMAGE AVAILABLE]

16. 4,416,783, Nov. 22, 1983, Liquid chromatography column, process for
preparing the same and its use for fractionation; Kohji Noguchi, et al.,
210/635, **198.2** [IMAGE AVAILABLE]

17. 4,353,801, Oct. 12, 1982, Special solvent column for GPC and GPC
method using the same; Yoshiyuki Mukoyama, et al., 210/635, **198.2**
[IMAGE AVAILABLE] 

18. 4,265,634, May 5, 1981, Chromatographic separation and quantitative
analysis of ionic species; Christopher A. Pohl, 436/161; 73/61.53;
210/198.2, 656; 422/70 [IMAGE AVAILABLE]

19. 4,217,223, Aug. 12, 1980, Gel permeation chromatograph system;
Nobuyuki Baba, et al., **210/198.2** [IMAGE AVAILABLE]

20. 4,160,728, Jul. 10, 1979, Bimodal chromatographic resolving zone;
Joseph J. Kirkland, et al., 210/656; 106/286.8; **210/198.2**; 502/527
[IMAGE AVAILABLE]

21. 4,118,316, Oct. 3, 1978, Quaternized siliceous supports for gel
permeation chromatography; Charles P. Talley, et al., 210/635, **198.2**,
502.1; 428/406 [IMAGE AVAILABLE]

22. 3,568,840, Mar. 9, 1971, PACKING MATERIALS FOR GEL PERMEATION
CHROMATOGRAPHY; Atsushi Hashimoto, **210/198.2**; 423/628 [IMAGE
AVAILABLE]

=> d kwic 1-22

US PAT NO: 5,431,807 [IMAGE AVAILABLE] L2: 1 of 22
US-CL-CURRENT: **210/198.2**, 502.1, 635, 656; 502/401, 402, 404

DETDESC:

DETD(4)

The . . . suspended in 50 ml aqueous 1 wt % solution of
poly(styrenesulfonic acid), molecular weight 5,000 (PSSA 5000) with very
narrow **molecular** **weight** **distribution**. The epoxide groups
located in the pores large enough to be reached by the polymeric acid
catalyst were hydrolyzed for . . .

DETDESC:

DETD(36)

In . . . the beads were suspended in 10 ml aqueous 1 wt. % solution of poly(styrenesulfonic acid), molecular weight 5,000 with narrow **molecular** **weight** **distribution**. Hydrolysis of epoxide groups placed in pores of a size large enough to accommodate the polymeric acid catalyst was continued. . . .

DETDESC:

DETD(48)

The . . . g) were suspended in 50 ml aqueous 1 wt. % solution of poly(styrenesulfonic acid), molecular weight 5,000 with very narrow **molecular** **weight** **distribution**. The epoxide groups located within pores larger than the molecular size of the polymeric acid catalyst in water were left. . . .

DETDESC:

DETD(51)

The beads were suspended in 50 ml aqueous 1 wt. % solution of poly(styrenesulfonic acid), molecular weight 47,000 with very narrow **molecular** **weight** **distribution**. Hydrolysis of epoxide groups placed in pores larger than size of poly(styrenesulfonic acid) MW 47,000 in water were hydrolyzed for. . . .

US PAT NO: 5,376,277 [IMAGE AVAILABLE] L2: 2 of 22
US-CL-CURRENT: 210/659; 95/86, 87; **210/198.2**, 656; 436/155, 161

DETDESC:

DETD(17)

The . . . preferred that the amount of polymer injected into the SEC columns 18 not exceed 2. μ .g in order to achieve accurate **molecular** **weight** **distributions**, as based upon the calibration procedure discussed above.

DETDESC:

DETD(19)

The . . . 450,000. This GC chromatogram is considered typical of the GC chromatograms obtained after pyrolysis of the appropriate section across the **molecular** **weight** **distribution**.

US PAT NO: 5,372,721 [IMAGE AVAILABLE] L2: 3 of 22
US-CL-CURRENT: 210/635; 209/1, 155, 209; **210/198.2**, 656, 659

SUMMARY:

BSUM(7)

Still . . . is generally described in U.S. Pat. No. 3,865,717 to Small. The use of such hydrodynamic chromatography in the characterization of **molecular** **weight** **distribution** is described in U.S. Pat. Nos. 4,532,043 and 4,629,566 to Prudhomme and Langhorst. U.S. Pat. Nos. 3,865,717, 4,532,043 and 4,629,566. . . .

US PAT NO: 5,316,680 [IMAGE AVAILABLE]

L2: 4 of 22

US-CL-CURRENT: 210/635, **198.2**, 502.1, 656; 502/401, 402, 404;
530/413, 417

DETDESC:

DETD(44)

The . . . suspended in 50 ml aqueous 1 wt % solution of poly(styrenesulfonic acid), molecular weight 5,000 (PSSA 5000) with very narrow **molecular** **weight** **distribution**. The epoxide groups located in the pores large enough to be reached by the polymeric acid catalyst were hydrolyzed for. . . .

DETDESC:

DETD(76)

In . . . the beads were suspended in 10 ml aqueous 1 wt. % solution of poly(styrenesulfonic acid), molecular weight 5,000 with narrow **molecular** **weight** **distribution**. Hydrolysis of epoxide groups placed in pores of a size large enough to accommodate the polymeric acid catalyst was continued. . . .

DETDESC:

DETD(88)

The . . . g) were suspended in 50 ml aqueous 1 wt. % solution of poly(styrenesulfonic acid), molecular weight 5,000 with very narrow **molecular** **weight** **distribution**. The epoxide groups located within pores larger than the molecular size of the polymeric acid catalyst in water were left. . . .

DETDESC:

DETD(91)

The beads were suspended in 50 ml aqueous 1 wt. % solution of poly(styrenesulfonic acid), molecular weight 47,000 with very narrow **molecular** **weight** **distribution**. Hydrolysis of epoxide groups placed in pores larger than size of poly(styrenesulfonic acid) MW 47,000 in water were hydrolyzed for. . . .

US PAT NO: RE 34,457 [IMAGE AVAILABLE]

L2: 5 of 22

US-CL-CURRENT: **210/198.2**, 502.1, 635, 656; 502/404; 536/63, 64

DETDESC:

DETD(28)

140 . . . cellulose triacetate produced by an ordinary homogeneous acetylation process (number-average degree of polymerization as determined by vapor pressure osmometry: 110; **molecular** **weight** **distribution** Mw/Mn=2.45, free hydroxyl group content: 0.35%) was swollen in 1.4 l of acetic acid (a guaranteed reagent of Kanto Kagaku). . . .



US PAT NO: 5,240,604 [IMAGE AVAILABLE] L2: 6 of 22
US-CL-CURRENT: **210/198.2**; 96/101; 210/656, 659; 422/70, 78, 80, 89

DETDESC:

DETD(17)

The . . . that the amount of polymer injected into the SEC columns 18 not exceed 2 .mu.g in order to achieve accurate **molecular** **weight** **distributions**, as based upon the calibration procedure discussed above.

DETDESC:

DETD(19)

The . . . 450,000. This GC chromatogram is considered typical of the GC chromatograms obtained after pyrolysis of the appropriate section across the **molecular** **weight** **distribution**.

US PAT NO: 5,190,658 [IMAGE AVAILABLE] L2: 7 of 22
US-CL-CURRENT: 210/656, **198.2**, 635; 530/417

SUMMARY:

BSTU(7)

Size . . . biological molecules, such as peptides, hormones or DNA. Size exclusion chromatography is used in the polymer chemistry field to determine **molecular** **weight** **distribution** of polymers and to isolate or resolve polymers of a particular size from a mixture of variously sized polymers.

US PAT NO: 5,183,604 [IMAGE AVAILABLE] L2: 8 of 22
US-CL-CURRENT: 264/40.1; 209/1, 155, 209; **210/198.2**, 656, 659; 264/236, 347

SUMMARY:

BSTU(7)

Still . . . is generally described in U.S. Pat. No. 3,865,717 to Small. The use of such hydrodynamic chromatography in the characterization of **molecular** **weight** **distribution** is described in U.S. Pat. Nos. 4,532,043 and 4,629,566 to Prudhomme and Langhorst. U.S. Pat. Nos. 3,865,717, 4,532,043 and 4,629,566. . .

US PAT NO: 5,080,798 [IMAGE AVAILABLE] L2: 9 of 22
US-CL-CURRENT: 210/656; 73/61.52; **210/198.2**, 635; 264/184

SUMMARY:

BSTU(6)

In . . . a fluorine-containing alcohol, such as hexafluorisopropanol, and chloroform into a gel permeation chromatographic column and elution with chloroform to determine **molecular** **weight** **distribution**

accurately.

US PAT NO: 4,992,168 [IMAGE AVAILABLE]

L2: 10 of 22

US-CL-CURRENT: **210/198.2**; 73/61.43, 64.54; 210/101, 656; 422/70

ABSTRACT:

An . . . fraction solutions; a detection unit E which deflects the results of fractionation obtained in the unit C and measures the **molecular** **weight** **distribution**; a system controller; and automatic temperature controllers.

SUMMARY:

BSUM(7)

The . . . branches decreases with increase in column temperature). The above literature teaches that the methyl branch distribution (crystallinity distribution) and the **molecular** **weight** **distribution** should preferably be combined together, but does not disclose any specific examples.

SUMMARY:

BSUM(8)

On . . . in the order of decreasing molecular sizes, is called the GPC method and has been widely used for determining the **molecular** **weight** **distribution** of the polymer (Aldgeld et al., "Gel Permeation Chromatography", published by Marcell Decker Co., U.S.A., 1971).

SUMMARY:

BSUM(9)

If . . . are combined together, the correlation can be analyzed between the chemical structure or molecular structure of a polymer and the **molecular** **weight** **distribution**. However, the aforementioned problem with regard to the speed of analysis is not solved even if they are simply combined. . . for example, a polymer is fractionated depending upon the molecular structure using the fractional dissolution column method and then the **molecular** **weight** **distributions** are determined for each of the obtained fractions by the GPC method.

SUMMARY:

BSUM(10)

In . . . precipitated polymer while stepwisely raising the temperature, and batchwisely sending the polymer fractions fractionated at each temperature step into a **molecular** **weight** **distribution** analyzer, in effecting composition fractionation by the fractional dissolution column method. The above publication further introduces an apparatus for concretely. . .

SUMMARY:

BSUM(19)

a detection unit E which detects the results of fractionation obtained in the unit C and measures the **molecular** **weight** **distribution**;

DETDESC:

DETD(22)

Valve . . . be detected by detector t. In general, use is made of a low molecular weight substance that does not have **molecular** **weight** **distribution** and that does not impair the fractional measurement. The internal standard substance can also be added to the sample polymer. . .

DETDESC:

DETD(49)

The . . . of columns need not necessarily be limited to two, but may be determined according to the range for measuring the **molecular** **weight** **distribution** and the isolation performance.

CLAIMS:

CLMS(1)

What . . .
polymer fraction solutions;
a detection unit E which detects the results of fractionation obtained in the unit C and measures the **molecular** **weight** **distribution**;
a system controller; and
automatic temperature controllers which are connected to the units A, B and C and which independently perform temperature. . .

US PAT NO: 4,983,528 [IMAGE AVAILABLE]

L2: 11 of 22

US-CL-CURRENT: 436/141; 73/61.52; **210/198.2**, 656; 422/70; 436/85,
142, 161

ABSTRACT:

A . . . detector in series with said ultraviolet detector provides a method for the simultaneous measurement of the amount of unsaturation, the **molecular** **weight** **distribution** and the amount of antioxidant in said rubbers.

SUMMARY:

BSUM(2)

The . . . diene terpolymers. The present invention also provides a method for the simultaneous measurement of the amount of u saturation, the **molecular** **weight** **distribution** and the amount of antioxidant in said unsaturated elastomeric interpolymers.

SUMMARY:

BSUM(4)

The . . . are key performance areas that the commercial rubber producer has to monitor. Amongst these are the level of unsaturation, the **molecular** **weight** **distribution**, the amount of ultraviolet stabilizer, the amount of antioxidant and the amount of plasticizer. Traditionally each of these parameters has. . .

SUMMARY:

BSUM(8)

To . . . no report of an analytical method which is capable of measuring simultaneously the unsaturation level, the antioxidant level and the **molecular** **weight** **distribution** of an unsaturated elastomeric interpolymer selected from the group consisting of butyl rubbers and ethylene-propylene-nonconjugated nonconjugated diene terpolymers.

SUMMARY:

BSUM(9)

There . . . the gel permeation chromatograph that it would be possible to measure simultaneously the unsaturation level, the antioxidant level and the **molecular** **weight** **distribution** of an unsaturated elastomeric interpolymer of one or more monoolefins and a diolefin.

SUMMARY:

BSUM(10)

Harrison, . . . carbonyl chromophore formed on the room temperature oxidation of the thin films was monitored by the ultraviolet detector while the **molecular** **weight** **distribution** was measured with the differential refractometer. It was not suggested, however, that this system could be employed for the analysis of the **molecular** **weight** **distribution** and the amount of unsaturation in unsaturated elastomeric interpolymers of at least one monoolefin and a diolefin.

SUMMARY:

BSUM(11)

Grinshpun . . . 54 pages 174-179 (1986), the use of a gel permeation chromatograph in combination with three different detectors to study the **molecular** **weight** **distributions** of a series of ethylene-propylene-nonconjugated diene terpolymers having different amounts of unsaturation. The levels of unsaturation o the terpolymers, however, . . .

SUMMARY:

BSUM(13)

Del . . . the use of a differential refractometer and an ultraviolet detector in series with a gel permeation chromatograph for determining the **molecular** **weight** **distribution** of a polymer together with

the low molecular weight additives present in it. No reference was made to the possibility. . . .

DETDESC:

DETD(7)

The method of the present invention further comprises a means whereby the amount of unsaturation, the **molecular** **weight** **distribution** and the amount of antioxidant in the unsaturated elastomeric interpolymer are simultaneously detected and quantified. In said method at the . . . exists the chromatographic columns the amount of unsaturation in said polymer molecules is detected by said ultraviolet detector and the **molecular** **weight** **distribution** of said polymer molecules is detected by said differential refractive index detector. The antioxidant initially present in said unsaturated elastomeric. . . . and fed to a computer which then generates a graph of the amount of unsaturation and a graph of the **molecular** **weight** **distribution** in the unsaturated elastomeric interpolymer passing through the chromatographic columns and a graph of the amount of antioxidant initially present. . . . the unsaturated elastomeric interpolymer, the areas under the graphs being proportional to the relative amount of unsaturation and the relative **molecular** **weight** **distribution** in the elastomeric interpolymer and the relative amount of antioxidant initially present in the elastomeric interpolymer. Preferably the computer will. . . .

DETDESC:

DETD(8)

Determination . . . and, in the case of the analysis of ethylene-propylene-nonconjugated diolefin rubbers, from standard solutions of the polymerized nonconjugated diolefin. The **molecular** **weight** **distribution** of the unsaturated elastomeric interpolymer is obtained by first calibrating the apparatus with a series of standards of known molecular weight and narrow **molecular** **weight** **distribution**. While it is preferable that the standards be of polymeric material that is very similar to the polymeric material being. . . . particular weight produces a differential refractive index response can be obtained. Such a correlation can be utilized to determine the **molecular** **weight** **distribution** of the unsaturated elastomeric interpolymer. The absolute amount of antioxidant that is present in the unsaturated elastomeric interpolymer is determined. . . .

DETDESC:

DETD(23)

The amount of unsaturation, the **molecular** **weight** **distribution** and the amount of antioxidant in a commercially available butyl rubber was determined according to the method of the present. . . .

DETDESC:

DETD(24)

A . . . then generated graphs, the areas under which were

proportional to the amount of unsaturation, the amount of antioxidant and the **molecular** **weight** **distribution** in the butyl rubber.

DETDESC:

DETD(26)

A calibration curve for determining the **molecular** **weight** **distribution** of the butyl rubber was obtained using the following procedure. Eight polystyrene standards of known molecular weight and narrow **molecular** **weight** **distribution** were first analyzed in order to derive a calibration curve for polystyrene and then by means of the [Mark-Houwink coefficients]. . .

DETDESC:

DETD(29)

% Unsaturation

4694843 1.68

Antioxidant (Irganox .RTM. 1010)

Average Area under Graph

Mole % Irganox .RTM. 1010

9383 0.14

Molecular **Weight** **Distribution**

M.sub.w M.sub.n M.sub.w /M.sub.n

705968 147966 4.77

CLAIMS:

CLMS(7)

7. . . . 1, which further comprises the simultaneous detection and quantification of the antioxidant content of said unsaturated elastomeric interpolymer and the **molecular** **weight** **distribution** of said unsaturated elastomeric interpolymer as said antioxidant and said unsaturated elastomeric interpolymer are eluted from said chromatographic columns.

CLAIMS:

CLMS(8)

8. . . . detector operated at about 217 nanometers to about 222 nanometres and about 275 nanometers to about 285 nanometers and the **molecular** **weight** **distribution** of said unsaturated elastomeric interpolymer is determined as said unsaturated elastomeric interpolymer is eluted from said chromatographic columns using a. . .

CLAIMS:

CLMS(10)

10. . . . according to claim 8, wherein the amount of unsaturation in said unsaturated elastomeric interpolymer, the amount of antioxidant and the **molecular** **weight** **distribution** of said unsaturated

elastomeric interpolymer are quantified by digitizing the output signals from the ultraviolet detector and the differential refractive. . . the areas under said graphs for the amount of unsaturation in the unsaturated elastomeric interpolymer, the amount of antioxidant and **molecular** **weight** **distribution** of said unsaturated elastomeric interpolymer are proportional to their relative amounts.

CLAIMS:

CLMS(11)

11. . . . according to claim 8, wherein said amount of unsaturation in the unsaturated elastomeric interpolymer, said amount of antioxidant and said **molecular** **weight** **distribution** of the unsaturated elastomeric interpolymer are quantified and compared to calibration curves.

US PAT NO: 4,846,968 [IMAGE AVAILABLE]
US-CL-CURRENT: **210/198.2**, 502.1; 502/404

L2: 12 of 22

DETDESC:

DETD(19)

140 g of commercially available cellulose triacetate (average DP=111 as determined by vapor pressure osmometry; **molecular** **weight** **distribution** M_{sub.w} /M_{sub.n} =2.45; free hydroxyl group content=0.35 wt. %) was allowed to swell in 1.4 l of acetic acid. Then. . . . 

US PAT NO: 4,818,394 [IMAGE AVAILABLE]
US-CL-CURRENT: **210/198.2**, 502.1, 635, 656; 502/404; 536/63, 64

L2: 13 of 22

DETDESC:

DETD(28)

140 . . . cellulose triacetate produced by an ordinary homogeneous acetylation process (number-average degree of polymerization as determined by vapor pressure osmometry: 110; **molecular** **weight** **distribution** M_w/M_n=2.45, free hydroxyl group content: 0.35%) was swollen in 1.4 l of acetic acid (a guaranteed reagent of Kanto Kagaku). 

US PAT NO: 4,786,416 [IMAGE AVAILABLE]
US-CL-CURRENT: 210/635, **198.2**, 502.1, 656

L2: 14 of 22

DETDESC:

DETD(19)

140 g of commercially available cellulose triacetate (average DP=111 as determined by vapor pressure osmometry; **molecular** **weight** **distribution** M_{sub.w} /M_{sub.n} =2.45; free hydroxyl group content=0.35 wt. %) was allowed to swell in 1.4 l of acetic acid. Then. . . . 

US PAT NO: 4,694,682 [IMAGE AVAILABLE]
US-CL-CURRENT: 73/61.53, 61.55; **210/198.2**, 656; 422/70

L2: 15 of 22

SUMMARY:

BSUM(13)

We . . . of the invention resides in the determination of the state of all organic bath constituents including determination of brightener concentration, **molecular** **weight**, **distribution** of leveler, organic contaminant concentration, etc. with a combined use of size exclusion chromatography, total organic carbon analysis and the. . .

DETDESC:

DETD(14)

Further . . . to optimize the plating quality of the metal deposit. Using these monitoring systems, the concentration of brightener can be made, **molecular** **weight** **distribution** of the polymeric constituents can be made, and a determination of the contamination of the plating bath by other organic. . .

DETDESC:

DETD(23)

I . . . the nature of the bath additives can be monitored. The concentration of the brighteners or levelers can be measured, the **molecular** **weight** **distribution** of the polymer can be monitored for the creation of low molecular weight species from the high molecular polymer, and. . .

US PAT NO: 4,416,783 [IMAGE AVAILABLE]
US-CL-CURRENT: 210/635, **198.2**

L2: 16 of 22

DETDESC:

DETD(21)

Vt . . . known method, however, is not recommended because it tends to bring about significant measuring errors under the influence of the **molecular** **weight** **distribution** of the developed polymer and the structure of the gel bed.

US PAT NO: 4,353,801 [IMAGE AVAILABLE]
US-CL-CURRENT: 210/635, **198.2**

L2: 17 of 22

ABSTRACT:

A . . . and a chlorine-containing organic solvent such as chloroform, is effective for enlarging the range of samples to be analyzed and **molecular**-**weight** **distribution** measurement can be conducted rapidly at normal temperatures by using said column.

SUMMARY:

BSUM(2)

This invention relates to a special solvent column for gel-permeation chromatography useful for measuring **molecular**-**weight** **distributions** of organic materials, the **molecular**-**weight** **distributions** of which have been impossible in gel-permeation

chromatography (hereinafter referred to as "GPC") using as an eluent tetrahydrofuran or chloroform.

SUMMARY:

BSUM(3)

It is an important thing to measure **molecular**-**weight** **distributions** of high polymers and organic oligomers rapidly in developing excellent organic materials and conducting careful quality control. In order to . . . to such a requirement, the GPC method has been developed and applied widely as a comparatively simple method for measuring **molecular**-**weight** **distributions**. The GPC is an analyzing method as described in, for example, J. C. Moore: J. Polym. Sci., A2, 835 (1964), . . . the solute molecule flowed out by using a suitable detector. Therefore, in order to conduct rapid and precise measurement of **molecular**-**weight** **distributions** by the GPC method, the quality of the column packed with a packing material is very important.

SUMMARY:

BSUM(5)

Thus, there is a limitation to solvents usable for measuring **molecular**-**weight** **distributions** effectively by using the GPC method and it is recommended to use a column packed with a packing material sufficiently. . . But since the measurement is carried out at such a high temperature, there are many problems in that a true **molecular**-**weight** **distribution** of the sample can hardly be obtained due to hydrolysis and the like of the sample, operation of the GPC. . .

SUMMARY:

BSUM(6)

Therefore, extensive studies have been made on solvents which can sufficiently dissolve a sample at normal temperatures and have a **molecular**-**weight** **distribution** measuring effect against porous styrene-divinylbenzene copolymer spherical particles and thus this invention has been accomplished.

DETDESC:

DETD(2)

The . . . a sample to be separated to go in and out freely in an eluent, it seems possible to measure a **molecular**-**weight** **distribution**. For example, in the case of polystyrene molecules, the pore sizes are those which allow going in and out of. . .

DETDESC:

DETD(9)

Samples which can be used for measuring **molecular**-**weight** **distributions** by using the column of this invention are thermoplastic

resins, thermosetting resins, natural resins, starting materials of these resins, intermediates. . .

DETDESC:

DETD(11)

The GPC column cannot be used for measuring **molecular**-**weight** **distributions** unless the three, i.e. the packing material, the eluent, and the sample, are properly fitted. That is, the eluent should.

DETDESC:

DETD(16)

Porous styrene-divinylbenzene copolymer spherical particles having a particle size of 5 to 15 .mu.m, and a **molecular**-**weight**-**distribution** measuring ability of a molecular weight of 5×10^3 of polystyrene (exclusive limit 5×10^3) were used as a packing material. A. . .



DETDESC:

DETD(18)

The **molecular**-**weight** **distribution** measurement of a PET oligomer dissolved previously in an eluent (a mixed solvent HFIP/CHCl₃ = 1/9 (volume ratio)) was conducted under. . .

DETDESC:

DETD(22)

Molecular-**weight** **distribution** of PET previously dissolved in the same eluent as used in Example 2 was measured under the conditions as described. . .

DETDESC:

DETD(23)

As . . . as PET oligomers, PET, polyesterimides and the like which are insoluble in THF or chloroform, can be used for measuring **molecular**-**weight** **distributions** by using a general-purpose analyzing apparatus at normal temperatures with good separability. Further, when a suitable mixing ratio of the. . . advantageous as an industrial analyzing means. That is, according to this invention, the range of samples practically useful for measuring **molecular**-**weight** **distributions** is broadened.

US PAT NO: 4,265,634 [IMAGE AVAILABLE]

L2: 18 of 22

US-CL-CURRENT: 436/161; 73/61.53; **210/198.2**, 656; 422/70

DETDESC:

DETD(29)

It . . . nuclear magnetic resonance techniques give some information regarding anionic surfactants, they are of limited value in determining the size and **molecular** **weight** **distribution**. Also, ion chromatography is not capable of analyzing organic surfactants.

US PAT NO: 4,217,223 [IMAGE AVAILABLE]
US-CL-CURRENT: **210/198.2**

L2: 19 of 22

SUMMARY:

BSUM(8)

In . . . sample is fed into the analysis column (6) in a measurement of the sample having large molecular weight and wide **molecular** **weight** **distribution**, an inner pressure in the analysis column (6) is elevated by its viscosity effect (about 2 Kg/cm.sup.2 in a case).

US PAT NO: 4,160,728 [IMAGE AVAILABLE]
US-CL-CURRENT: 210/656; 106/286.8; **210/198.2**; 502/527

L2: 20 of 22

DETDESC:

DETD(14)

In . . . bimodal distribution produces a much wider linear portion. The calibration curve for the polymodal distribution does not encompass the entire **molecular** **weight** **distribution** of the sample within its linear range, whereas the calibration curve for the bimodal distribution does.

DETDESC:

DETD(15)

The . . . shown by the bimodal pore size distribution is greatly preferred when attempting to characterize a polymer with the type of **molecular** **weight** **distribution** illustrated at the bottom of the plot.

US PAT NO: 4,118,316 [IMAGE AVAILABLE]
US-CL-CURRENT: 210/635, **198.2**, 502.1; 428/406

L2: 21 of 22

SUMMARY:

BSUM(2)

Gel permeation chromatography is a form of chromatography which fractionates polymers and determines their molecular weight and **molecular** **weight** **distribution**. It is a type of liquid-solid elution chromatography that uses a column packed with an inert porous matrix which is . . .

US PAT NO: 3,568,840 [IMAGE AVAILABLE]
US-CL-CURRENT: **210/198.2**; 423/628

L2: 22 of 22

SUMMARY:

BSUM(14)

Although . . . will be required for accurate separation of solute molecules, such as polymerized substances, which usually have more or less broad **molecular** **weight** **distribution**.

SUMMARY:

BSUM(17)

The . . . of this invention may be used in any application of the GPC, as for example, in the measurement of the **molecular** **weight** **distribution** of various compounds, such as high and low molecular weight substances, or in the separation thereof and in any biochemical.

SUMMARY:

BSUM(18)

When used to measure the **molecular** **weight** **distribution**, said novel alumina packing material is packed into a column, the substances to be detected, for example high molecular weight. . . .

SUMMARY:

BSUM(20)

The . . . Thus, for example, with proper selection of the pore size of the alumina packing material polymers having a relatively narrow **molecular** **weight** **distribution** can be separated and a sufficient selectivity can be achieved with a column containing only one type alumina packing material. . . . If need be, selectivity may be increased by increasing the number of columns. The analysis of polymers having a wide **molecular** **weight** **distribution** can be made with satisfactory selectivity by preparing several types of novel alumina packing materials having different pore sizes and. . . .

DETDESC:

DETD(7)

Sample-- Polystyrene, synthesized by anion polymerization and whose molecular weight and **molecular** **weight** **distribution** were accurately determined by using light scattering technique and ultracentrifugation,

=>

DETD(7)

Sample-- Polystyrene, synthesized by anion polymerization and whose molecular weight and **molecular** **weight** **distribution** were accurately determined by using light scattering technique and ultracentrifugation,

=> s 5354852/pn

L3 1 5354852/PN

=> d his

(FILE 'USPAT' ENTERED AT 15:21:58 ON 04 OCT 96)

L1 7700 S MOLECULAR(W)WEIGHT? (W)DISTRIBUTION?

L2 22 S L1 AND 210/198.2/CCLST

L3 1 S 5354852/PN

=> s l1 and l3

L4 0 L1 AND L3

=> s l1 and 210/656-659/cclst

1286 210/656-659/CCLST (4 TERMS)

(210/656+NEXT3/CCLST)

L5 28 L1 AND 210/656-659/CCLST

=> s l5 not l3

L6 28 L5 NOT L3

=> s l5 not l2

L7 12 L5 NOT L2

=> d 1-12

1. 5,521,100, May 28, 1996, Method of determining the **molecular** **weight** **distribution** of carboxymethylcellulose or a salt thereof; Yukio Uda, et al., 436/161; **210/656**; 436/94, 128, 129; 536/98 [IMAGE AVAILABLE]

2. 5,262,057, Nov. 16, 1993, Process for separating from one another the non-functional, monofunctional and bifunctional species contained in the perfluoropolyoxyalkylenes; Claudio Tonelli, et al., **210/656**, 635; 570/262 [IMAGE AVAILABLE] 

3. 5,246,588, Sep. 21, 1993, Process for separating from on another the non-functional, monofunctional and bifunctional species contained in the perfluoropolyoxyalkylenes; Claudio Tonelli, et al., **210/656**, 635; 570/262 [IMAGE AVAILABLE] 

4. 5,008,204, Apr. 16, 1991, Method for determining the compositional distribution of a crystalline copolymer; Ferdinand C. Stehling, 436/85; 73/53.01, 64.54; **210/656**, 774; 436/161 [IMAGE AVAILABLE]

5. 4,781,893, Nov. 1, 1988, Apparatus for determining fouling tendency of liquid hydrocarbons using polar polymeric membranes; Ghazi B. Dickakian, 422/69; 73/61.62; 210/198.3, **658**; 422/82.05, 82.09; 436/2, 60, 162 [IMAGE AVAILABLE]

6. 4,781,892, Nov. 1, 1988, Apparatus and method for determining fouling tendency of liquid hydrocarbons; Ghazi B. Dickakian, 422/69; 73/61.74; 210/198.3, **658**; 422/82.05, 82.09; 436/2, 60, 162 [IMAGE AVAILABLE]

7. 4,671,103, Jun. 9, 1987, Method for determining crude oil fouling by high performance liquid chromatography; Ghazi B. Dickakian, 73/61.52; **210/656** [IMAGE AVAILABLE]

8. 4,629,566, Dec. 16, 1986, Method for characterizing the molecular

weight and **molecular** **weight** **distribution** of ultra-high molecular weight water soluble polymers; Robert K. Prud'homme, et al., 210/635, **656**; 422/70 [IMAGE AVAILABLE]

9. 4,628,726, Dec. 16, 1986, Analysis of organic compounds in baths used in the manufacture of printed circuit board using novel chromatographic methods; Kurt E. Heikkila, et al., 73/61.53, 61.52; **210/656**; 436/161 [IMAGE AVAILABLE]

10. 4,532,043, Jul. 30, 1985, Method for characterizing the molecular weight and **molecular** **weight** **distribution** of ultra-high molecular weight water soluble polymers; Robert K. Prud'homme, et al., 210/635, **656** [IMAGE AVAILABLE]

11. 4,334,972, Jun. 15, 1982, Ampholyte and its use in separation processes; John L. Soderberg, 204/548, 549; 210/635, **656**; 252/62.2 [IMAGE AVAILABLE]

12. 4,168,371, Sep. 18, 1979, Process for making lignin gels in bead form; Wynford Brown, 528/482; **210/656**; 679; 502/402 [IMAGE AVAILABLE] => d kwic 1-12

US PAT NO: 5,521,100 [IMAGE AVAILABLE] L7: 1 of 12
TITLE: Method of determining the **molecular** **weight**
 distribution of carboxymethylcellulose or a salt
 thereof
US-CL-CURRENT: 436/161; **210/656**; 436/94, 128, 129; 536/98

ABSTRACT:

The **molecular** **weight** **distribution** of carboxymethylcellulose or its salt is determined by gel permeation chromatography using a metal-amine complex and/or a metal-alkali complex as. . . and flow rate for this determination are 1:40-100 and 0.2-0.5 ml/min., respectively. According to this method, the GPC determination of **molecular** **weight** **distribution** can be performed under the same conditions for both starting pulp and CMC.

SUMMARY:

BSUM(2)

This invention relates to a method of determining the **molecular** **weight** **distribution** of carboxymethylcellulose or a salt thereof (hereinafter referred to briefly as CMC).

SUMMARY:

BSUM(3)

While . . . is conventionally produced from pulp, an efficient quality and process control through its manufacturing stage demands that the conditions of **molecular** **weight** **distribution** analysis of CMC be identical with those of the material pulp.

SUMMARY:

BSUM(5)

In the conventional GPC technology for **molecular** **weight** **distribution** analysis, said two determinations (for pulp and CMC) cannot be carried out under identical conditions because pulp and CMC cannot.

SUMMARY:

BSUM(6)

For these reasons, GPC analyses of the **molecular** **weight** **distributions** of pulp and CMC have heretofore been performed using different mobile phase solvents under different conditions, thus presenting the problem that the **molecular** **weight** **distribution** of starting pulp and that of CMC cannot be exactly compared in equal terms.

SUMMARY:

BSUM(8)

Incidentally, Graham Agg and coworkers reported in 1980 that they determined the **molecular** **weight** **distributions** of sulfite pulp and PHK pulp by GPC using an aqueous solution of iron sodium tartrate complex as the mobile.

SUMMARY:

BSUM(11)

The object of this invention is to provide a method by which the molecular weight and **molecular** **weight** **distribution** of CMC can be determined under the same conditions as its starting pulp.

SUMMARY:

BSUM(13)

The . . . characterized in that a solvent containing a metal-amine complex and/or a metal-alkali complex is used in the determination of the **molecular** **weight** **distribution** of CMC.

DETDESC:

DETD(14)

By controlling the above-mentioned column geometry and flow rate, the peak values of **molecular** **weight** **distributions** of both pulp and CMC can be easily found and the molecular weight determinations are also facilitated.

DETDESC:

DETD(31)

In accordance with this invention, determination of the **molecular** **weight** **distribution** of starting pulp and that of CMC can be performed under identical conditions. This feature contributes greatly to quality control.

DETDESC:

DETD(46)

Prior to GPC determination of the **molecular** **weight** **distribution** of the CMC sample and that of the pulp sample, the retention time values of at least two standard CMC. . .

DETDESC:

DETD(52)

In this manner the GPC determination of molecular weight and **molecular** **weight** **distribution** could be carried out under the same conditions for pulp and CMC.

DETDESC:

DETD(63)

Prior to GPC determination of the **molecular** **weight** **distribution** of the CMC sample and that of the pulp sample, the retention time values of at least two standard CMC. . .

DETDESC:

DETD(68)

It is thus clear that the GPC determination of molecular weight and **molecular** **weight** **distribution** can be carried out under the same conditions for pulp and CMC.

CLAIMS:

CLMS(1)

What is claimed is:

1. A method of determining the **molecular** **weight** **distribution** of carboxymethylcellulose or a salt thereof by using gel permeation chromatography which comprises the steps of obtaining a sample by. . . sample from the column by flowing said solvent containing said metal-alkali through said column, analyzing the eluent, and determining the **molecular** **weight** **distribution** from the result of the analysis.

US PAT NO: 5,262,057 [IMAGE AVAILABLE]

L7: 2 of 12

US-CL-CURRENT: **210/656**, 635; 570/262

SUMMARY:

BSUM(11)

where . . . average molecular weight ranging from about 500 to about 10,000, but preferably from about 2,000 to about 4,000, with a **molecular** **weight** **distribution** ranging from 1.5 to 2.5. Minor amounts of monomeric units of formula --(CF₂)₂-C₂H₄-(CF₂)₂O-- can be present. . .

US PAT NO: 5,246,588 [IMAGE AVAILABLE]
US-CL-CURRENT: **210/656**, 635; 570/262

L7: 3 of 12

SUMMARY:

BSUM(11)

In . . . average molecular weight ranging from about 500 to about 10,000, but preferably from about 500 to about 4,000, with the **molecular** **weight** **distribution** preferably ranging from 1.5 to 2.5;

US PAT NO: 5,008,204 [IMAGE AVAILABLE] L7: 4 of 12
US-CL-CURRENT: 436/85; 73/53.01, 64.54; **210/656**, 774; 436/161

SUMMARY:

BSUM(4)

Crystalline copolymers, such as linear low density polyethylene (LLDPE) and ethylene vinyl acetate (EVA), are known to have **molecular** **weight** **distributions** and composition distributions. The properties of copolymers having similar average compositions can vary considerably depending upon the compositional distribution of. . . example, in co-pending application serial number 944,385 filed 12/19/B6 which is incorporated herein by reference, it was established that the **molecular** **weight** **distribution** for Exxon LL3001 linear low density polyethylene resin was narrower than the **molecular** **weight** **distribution** of another commercially available linear low density polyethylene. Compositional distributions are known to have a strong effect on the physical. . .

SUMMARY:

BSUM(6)

Fractionation . . . collected in consecutive fractions which are identified by a starting and ending column temperature. These fractions are then analyzed for **molecular** **weight** **distribution** and monomer composition by conventional means.

DETDESC:

DETD(11)

The . . . of solvent containing dissolved copolymer can then be analyzed by conventional means for molecular weight and composition to establish the **molecular** **weight** **distribution** and composition distribution of monomer. Alternatively to determining the monomer composition for each fraction, a calibration curve relating elution temperature. . .

US PAT NO: 4,781,893 [IMAGE AVAILABLE] L7: 5 of 12
US-CL-CURRENT: 422/69; 73/61.62; 210/198.3, **658**; 422/82.05, 82.09;
436/2, 60, 162

DETDESC:

DETD(25)

Asphaltenes present in crude oils have high average molecular weight ($M_n=900-1300$) and a very broad **molecular** **weight** **distribution**. Gel permeation chromatographic (GPC) characterization of two crude oil asphaltenes molecules indicates the presence of molecular weight as high as. . .

US PAT NO: 4,781,892 [IMAGE AVAILABLE] L7: 6 of 12
US-CL-CURRENT: 422/69; 73/61.74; 210/198.3, **658**; 422/82.05, 82.09;
436/2, 60, 162

DETDESC:

DETD(21)

Asphaltenes present in crude oils have high average molecular weight ($M_n=900-1300$) and a very broad **molecular** **weight** **distribution**. Gel permeation chromatographic (GPC) characterization of two crude oil asphaltenes molecules indicates the presence of molecular weight as high as. . .

US PAT NO: 4,671,103 [IMAGE AVAILABLE] L7: 7 of 12
US-CL-CURRENT: 73/61.52; **210/656**

DETDESC:

DETD(4)

Asphaltenes present in heavy hydrocarbons have high molecular weight and very broad **molecular** **weight** **distribution**, sometimes with molecular weights up to 10,000.

US PAT NO: 4,629,566 [IMAGE AVAILABLE] L7: 8 of 12
TITLE: Method for characterizing the molecular weight and
molecular **weight** **distribution** of ultra-high
molecular weight water soluble polymers
US-CL-CURRENT: 210/635, **656**; 422/70

ABSTRACT:

The molecular weight and **molecular** **weight** **distribution** of diverse ultra-high molecular weight water soluble polymers is rapidly determined based on apparent size by passage of extremely dilute. . .

SUMMARY:

BSUM(2)

Ultra-high . . . soluble synthetic and natural polymers are used in a variety of important industrial and other applications. Better knowledge of the **molecular** **weight** **distribution** of these polymers could contribute significantly to their design and also provide a better understanding of their behavior in given applications. There have been numerous attempts to characterize the **molecular** **weight** **distribution** of these polymers by conventional size exclusion chromatography (SEC). The principal shortcomings associated with the application of this analytical technique. . . materials generally have an exclusion limit of about 2M. That is, SEC can generally be used to

size molecules >2M. The **molecular** **weight** **distribution** of important water soluble polymers can range up to .gtoreq.30M based on sedimentation experiments. Application of SEC methods provides little.

SUMMARY:

BSUM(16)

"**Molecular** **weight** **distribution**" means a tabulation of molecular weight fractions and their relative amounts as calculated based on apparent size.

SUMMARY:

BSUM(19)

The invention is a new liquid chromatographic method for characterizing ultra-high molecular weight, water soluble polymers according to **molecular** **weight** **distribution**. The technique is particularly of value in characterizing polymers with weight average molecular weights (M.sub.w) of greater than .about.2M (or. . . .

SUMMARY:

BSUM(20)

Specifically the invention is an improved liquid chromatographic method for characterizing water soluble polymers by molecular weight and **molecular** **weight** **distribution** based on apparent size which comprises:

SUMMARY:

BSUM(24)

(d) using the data of step (c) to characterize the molecular weight and **molecular** **weight** **distribution** of the detected water soluble polymer.

DRAWING DESC:

DRWD(6)

FIG. 4 is a typical **molecular** **weight** **distribution** (in graph form) developed using the invention.

DETDESC:

DETD(6)

The . . . Analytical A/D converter which can be successfully used to digitize the chromatographic data. A computer 12 calculates molecular weight and **molecular** **weight** **distribution** based on the digitized output of A/D converter 11. The computer is suitably a Hewlett Packard HP-85 with I/O ROM,

DETDESC:

DETD(27)

The . . . The signal intensity and the molecular weight of that point are then used to calculate the average molecular weights and **molecular** **weight** **distribution** using the following relationships: ##EQU1## The above relationships are the same as those used in SEC and were used here. . . (i.e., step (d) of claim 1) may broadly be practiced using any scientifically accepted expression to calculate molecular weight and **molecular** **weight** **distribution** from the developed chromatographic data.

DETDESC:

DETD(28)

FIGS. . . . copolymer of acrylamide and acrylic acid. Using a previously determined calibration relationship and appropriate calculations such as previously described, the **molecular** **weight** **distribution** illustrated in FIG. 4 is calculated from the chromatogram, which is illustrated in FIG. 3. Also calculated are the average. . . .

DETDESC:

DETD(36)

The calculated **molecular** **weight** **distributions** of the 28.4 percent and 7.7 percent samples are essentially identical. The calculated molecular weights for these samples are tabulated. . . .

CLAIMS:

CLMS(1)

What is claimed is:

1. A liquid chromatographic method for characterizing water soluble polymers by molecular weight and **molecular** **weight** **distribution** based on apparent size which comprises:
 - (a) adding to an aqueous eluent a sample of a detectable ultra-high molecular weight. . . . apparent size fractions of the polymer species; and
 - (d) using the data of step (c) to characterize the molecular weight and **molecular** **weight** **distribution** of the detected water soluble polymer.

CLAIMS:

CLMS(2)

2. The method of claim 1 used for characterizing the molecular weight and **molecular** **weight** **distribution** of polymer samples of about .gtoreq.2 million weight average molecular weight (M.sub.w).

CLAIMS:

CLMS(4)

4. A liquid chromatographic method for characterizing water soluble polymers by molecular weight and **molecular** **weight** **distribution** based on apparent size which comprises:
(a) tagging the polymer with a fluorescent group;
(b) adding the polymer in aqueous diluent. . . the polymer species based on fluorescence detection; and
(e) using the data of step (d) to characterize the molecular weight and **molecular** **weight** **distribution** of the detected water soluble polymer.

CLAIMS:

CLMS (5)

5. The method of claim 4 used for characterizing the molecular weight and **molecular** **weight** **distribution** of polymer samples of about gtoreq.2 million weight average molecular weight (M.sub.w).

US PAT NO: 4,628,726 [IMAGE AVAILABLE] L7: 9 of 12
US-CL-CURRENT: 73/61.53, 61.52; **210/656**; 436/161

SUMMARY:

BSUM(15)

We . . . of the invention resides in the determination of the state of all organic bath constituents including determination of brightener concentration, **molecular** **weight**, **distribution** of leveler, organic contaminant concentration, etc. with a combined use of size exclusion chromatography, total organic carbon analysis and the. . .

DETDESC:

DETD(14)

Further . . . to optimize the plating quality of the metal deposit. Using these monitoring systems, the concentration of brightener can be made, **molecular** **weight** **distribution** of the polymeric constituents can be made, and a determination of the contamination of the plating bath by other organic. . .

DETDESC:

DETD(23)

I . . . baths upstream of the plating bath, can be monitored. The concentration of the brighteners or levelers can be measured, the **molecular** **weight** **distribution** of the polymer can be monitored for the creation of low molecular weight species from the high molecular polymer, and. . .

US PAT NO: 4,532,043 [IMAGE AVAILABLE] L7: 10 of 12
TITLE: Method for characterizing the molecular weight and
molecular **weight** **distribution** of ultra-high
molecular weight water soluble polymers
US-CL-CURRENT: 210/635, **656**

ABSTRACT:

The molecular weight and **molecular** **weight** **distribution** of diverse ultra-high molecular weight water soluble polymers is rapidly determined based on apparent size by passage of extremely dilute.

SUMMARY:

BSUM(2)

Ultra-high . . . soluble synthetic and natural polymers are used in a variety of important industrial and other applications. Better knowledge of the **molecular** **weight** **distribution** of these polymers could contribute significantly to their design and also provide a better understanding of their behavior in given applications. There have been numerous attempts to characterize the **molecular** **weight** **distribution** of these polymers by conventional size exclusion chromatography (SEC). The principal shortcomings associated with the application of this analytical technique. . . materials generally have an exclusion limit of .about.2M. That is, SEC can generally be used to size molecules <2M. The **molecular** **weight** **distribution** of important water soluble polymers can range up to .gtoreq.30M based on sedimentation experiments. Application of SEC methods provides little. . .

SUMMARY:

BSUM(15)

"**Molecular** **weight** **distribution**" means a tabulation of molecular weight fractions and their relative amounts as calculated based on apparent size.

SUMMARY:

BSUM(18)

The invention is a new liquid chromatographic method for characterizing ultra-high molecular weight, water soluble polymers according to **molecular** **weight** **distribution**. The technique is particularly of value in characterizing polymers with weight average molecular weights ($M_{sub}w$) of greater than .about.2M (or. . .

SUMMARY:

BSUM(19)

Specifically the invention is an improved liquid chromatographic method for characterizing water soluble polymers by molecular weight and **molecular** **weight** **distribution** based on apparent size which comprises:

SUMMARY:

BSUM(23)

(d) using the data of step (c) to characterize the molecular weight and **molecular** **weight** **distribution** of the detected water soluble polymer.

SUMMARY:

BSUM(35)

FIG. 4 is a typical **molecular** **weight** **distribution** (in graph form) developed using the invention.

SUMMARY:

BSUM(41)

The . . . Analytical A/D converter which can be successfully used to digitize the chromatographic data. A computer 12 calculates molecular weight and **molecular** **weight** **distribution** based on the digitized output of A/D converter 11. The computer is suitably a Hewlett Packard HP-85 with I/O ROM, . . .

DETDESC:

DETD(10)

The . . . The signal intensity and the molecular weight of that point are then used to calculate the average molecular weights and **molecular** **weight** **distribution** using the following relationships: ##EQU1## The above relationships are the same as those used in SEC and were used here. . . step (d) of claim 1) may be broadly be practiced using any scientifically accepted expression to calculate molecular weight and **molecular** **weight** **distribution** from the developed chromatographic data.

DETDESC:

DETD(11)

FIGS. . . copolymer of acrylamide and acrylic acid. Using a previously determined calibration relationship and appropriate calculations such as previously described, the **molecular** **weight** **distribution** illustration in FIG. 4 is calculated from the chromatogram, which is illustrated in FIG. 3. Also calculated are the average. . .

DETDESC:

DETD(18)

The calculated **molecular** **weight** **distributions** of the 28.4 percent and 7.7 percent samples are essentially identical. The calculated molecular weights for these samples are tabulated. . .

CLAIMS:

CLMS(1)

What is claimed is:

1. A liquid chromatographic method for characterizing water soluble polymers by molecular weight and **molecular** **weight**

distribution based on apparent size which comprises:
(a) adding to an aqueous eluent a sample of a detectable ultra-high molecular weight. . . . apparent size fractions of the polymer species; and
(d) using the data of step (c) to characterize the molecular weight and **molecular** **weight** **distribution** of the detected water soluble polymer.

CLAIMS:

CLMS (2)

2. The method of claim 1 used for characterizing the molecular weight and **molecular** **weight** **distribution** of polymer samples of about .gtoreq.2 million weight average molecular weight (M.sub.w).

CLAIMS:

CLMS (3)

3. A liquid chromatographic method for characterizing water soluble polymers by molecular weight and **molecular** **weight**

distribution based on apparent size which comprises:

(a) tagging the polymer with a fluorescent group;
(b) adding the polymer in aqueous diluent. . . . the polymer species based on fluorescence detection; and
(e) using the data of step (d) to characterize the molecular weight and **molecular** **weight** **distribution** of the detected water soluble polymer.

CLAIMS:

CLMS (4)

4. The method of claim 3 used for characterizing the molecular weight and **molecular** **weight** **distribution** of polymer samples of about .gtoreq.2 million weight average molecular weight (M.sub.w).

US PAT NO: 4,334,972 [IMAGE AVAILABLE]

L7: 11 of 12

US-CL-CURRENT: 204/548, 549; 210/635, **656**; 252/62.2

SUMMARY:

BSUM(66)

In this connection there may, for instance, be obtained a mixture having a narrower **molecular** **weight** **distribution** and/or adjusted range width of pI-values and/or having a more uniform conductivity distribution.

SUMMARY:

BSUM(69)

The **molecular** **weight** **distribution** is preferably chosen such that more than 90% by weight of the mixture falls within the molecular weight range of. . . .

US PAT NO: 4,168,371 [IMAGE AVAILABLE]
US-CL-CURRENT: 528/482; **210/656**, 679; 502/402

L7: 12 of 12

DETDESC:

DETD(27)

Narrow **molecular** **weight** **distribution** polystyrene standards
(Pressure Chemical Co., Pittsburgh) of weight average molecular weights
(M) 2,900; 3,600; 15,000; 19,500; 35,000; 110,000; 200,000; and. . .
=>

(X)

Narrow **molecular** **weight** **distribution** polystyrene standards (Pressure Chemical Co., Pittsburgh) of weight average molecular weights (M) 2,900; 3,600; 15,000; 19,500; 35,000; 110,000; 200,000; and. . .
=> s 11 and 210/635/cclst

507 210/635/CCLST

L8 20 L1 AND 210/635/CCLST

=> d his

(FILE 'USPAT' ENTERED AT 15:21:58 ON 04 OCT 96)

L1 7700 S MOLECULAR(W)WEIGHT?(W)DISTRIBUTION?

L2 22 S L1 AND 210/198.2/CCLST

L3 1 S 5354852/PN

L4 0 S L1 AND L3

L5 28 S L1 AND 210/656-659/CCLST

L6 28 S L5 NOT L3

L7 12 S L5 NOT L2

L8 20 S L1 AND 210/635/CCLST

=> s 18 not 17

L9 15 L8 NOT L7

=> s 19 not 12

L10 4 L9 NOT L2

=> d 1-4

1. 4,312,727, Jan. 26, 1982, Glyoxal agarose and zonal immobilization of proteins therewith; John R. Shainoff, 204/469; **210/635**; 252/315.3; 436/177, 516 [IMAGE AVAILABLE]

2. 3,962,206, Jun. 8, 1976, Gel chromatography process for fractionating ionic polymers; George B. Butler, **210/635**; 521/25 [IMAGE AVAILABLE]

3. 3,837,217, Sep. 24, 1974, MEASUREMENT OF POLYMER **MOLECULAR** **WEIGHT** **DISTRIBUTION**; Wolfgang W. Schulz, 73/61.52; **210/635**; 436/2, 85 [IMAGE AVAILABLE]

4. 3,657,117, Apr. 18, 1972, GEL CHROMATOGRAPHY; Klaus Pfitzner, et al., **210/635** [IMAGE AVAILABLE]

=> d kwic 1-4

US PAT NO: 4,312,727 [IMAGE AVAILABLE]

L10: 1 of 4

US-CL-CURRENT: 204/469; **210/635**; 252/315.3; 436/177, 516

DETDESC:

DETD(23)

Cascade immunoelectrophoretic analysis of the **molecular** **weight** **distribution** of fibrinogen related antigens in the plasma fibrinogen sample. The plasma proteins together with a fluorescent labelled ribonuclease marker were. . .

US PAT NO: 3,962,206 [IMAGE AVAILABLE]

L10: 2 of 4

US-CL-CURRENT: **210/635**; 521/25

SUMMARY:

BSUM(8)

The . . . method has proved to be very useful for the fractionation of polymers. The method has been used to determine the **molecular**

weight **distribution** of various polymer systems or for the preparation of fractions of polymer systems with well-defined **molecular** **weight** **distributions**. Because of the high resolving power, speed and possibility of a high degree of automation, gel permeation chromatography is the. . .

US PAT NO: 3,837,217 [IMAGE AVAILABLE] L10: 3 of 4
TITLE: MEASUREMENT OF POLYMER **MOLECULAR** **WEIGHT**
DISTRIBUTION

US-CL-CURRENT: 73/61.52; **210/635**; 436/2, 85

ABSTRACT:

For use with a gel permeation chromatograph measuring **molecular** **weight** **distribution** of polymeric materials, the combination of a piezoelectric crystal detector for measuring mass with an automatic viscometer for inferential measurement of molecular weight provides improved measurement of absolute **molecular** **weight** **distribution** of polymeric materials. Recycling of polymer fractions through the gel permeation chromatograph provides improved resolution of the individual fractions.

SUMMARY:

BSUM(2)

Measurement of the **molecular** **weight** **distribution** of high molecular weight polymers is of particular interest because the physical properties of the polymers are related thereto. In. . . weight polymer present. By detecting the amount and the molecular weight of fractions of the effluent from the chromatograph, the **molecular** **weight** **distribution** of a polymer mixture may be obtained.

SUMMARY:

BSUM(3)

The technique most commonly used in the prior art for measuring the **molecular** **weight** **distribution** used two detectors, neither of which gives a direct measurement of the variables, molecular weight and quantity. A measurement of. . .

SUMMARY:

BSUM(6)

A recent improvement in the measurement of **molecular** **weight** **distribution** is described in the Journal of Polymer Science, A-2, Vol. 8, page 1227 (1970). This improved technique is to add. . .

SUMMARY:

BSUM(7)

It is, in general, desirable to make a direct measurement of **molecular** **weight** **distribution**. This would minimize the calibration difficulties, make possible measurement of unknown polymers, give more accurate results, and finally, would permit correlation with other techniques of measuring **molecular** **weight** **distribution**.

The present invention, which comprises a significant improvement over the prior art, makes possible a closer approach than has heretofore been possible to a direct measurement of **molecular** **weight** **distribution**.

SUMMARY:

BSUM(9)

Improved measurement of the **molecular** **weight** **distribution** of polymers is obtained by a novel detector package for a gel permeation chromatograph. A polymer which has been separated . . . change in vibrational frequency of the crystal. Combining the polymer mass of each fraction and the molecular weight yields the **molecular** **weight** **distribution**. Owing to the imprecise separation of the columns presently available, it is necessary to recycle the first fractions through the . . .

DRAWING DESC:

DRWD(3)

FIG. 1 illustrates schematically the process of the present invention including the measurements and subsequent calculational processes by which the **molecular** **weight** **distribution** of polymers is determined; and

DETDESC:

DETD(19)

The . . . and solvent. The resulting molecular weight may then be combined with the weight corresponding to that fraction to prepare a **molecular** **weight** **distribution** curve corresponding to the polymer which has been analyzed. This typical curve is illustrated schematically as 38.

CLAIMS:

CLMS(1)

What is claimed is:

1. A method of determining the absolute **molecular** **weight** **distribution** of polymeric materials as they are eluted from a gel permeation chromatographic column by a solvent comprising the following steps: . . .

for each of said portions the molecular weight of step (i) with the mass of step (b) to obtain the **molecular** **weight** **distribution** of said polymer.

CLAIMS:

CLMS(3)

3. An apparatus for determining the **molecular** **weight** **distribution** of polymeric materials as they are eluted from a gel permeation chromatographic column by a solvent comprising:

a. a calibrated.

CLAIMS:

CLMS (4)

4. The apparatus of claim 3 further comprising means for calculating the **molecular** **weight** **distribution** of said polymer.

US PAT NO: 3,657,117 [IMAGE AVAILABLE]
US-CL-CURRENT: **210/635**

L10: 4 of 4

DETDESC:

DETD(57)

Special uses of the new gels are, for example, the determination of the **molecular** **weight** **distribution** of polymers. In the oligomeric range, substances can be isolated with molecular uniformity. Thus, for example, oligophenylens, oligourethanes, oligoethylene glycols. . . separated into fractions of molecular uniformity. In the case of polymers, for example polystyrene, polyvinyl acetate or polyvinyl chloride, the **molecular** **weight** **distribution** can be determined, or fractions with only a slight non-uniformity can be obtained on a preparative scale.

=> d his

(FILE 'USPAT' ENTERED AT 15:21:58 ON 04 OCT 96)

L1 7700 S MOLECULAR(W)WEIGHT?(W)DISTRIBUTION?
L2 22 S L1 AND 210/198.2/CCLST
L3 1 S 5354852/PN
L4 0 S L1 AND L3
L5 28 S L1 AND 210/656-659/CCLST
L6 28 S L5 NOT L3
L7 12 S L5 NOT L2
L8 20 S L1 AND 210/635/CCLST
L9 15 S L8 NOT L7
L10 4 S L9 NOT L2
=>

> d his

(FILE 'USPAT' ENTERED AT 15:21:58 ON 04 OCT 96)

L1 7700 S MOLECULAR(W) WEIGHT? (W) DISTRIBUTION?
L2 22 S L1 AND 210/198.2/CCLST
L3 1 S 5354852/PN
L4 0 S L1 AND L3
L5 28 S L1 AND 210/656-659/CCLST
L6 28 S L5 NOT L3
L7 12 S L5 NOT L2
L8 20 S L1 AND 210/635/CCLST
L9 15 S L8 NOT L7
L10 4 S L9 NOT L2

L8 20 L1 AND 210/635/CCLST

=> d his

(FILE 'USPAT' ENTERED AT 15:21:58 ON 04 OCT 96)

L1 7700 S MOLECULAR(W)WEIGHT? (W)DISTRIBUTION?

L2 22 S L1 AND 210/198.2/CCLST

L3 1 S 5354852/PN

L4 0 S L1 AND L3

L5 28 S L1 AND 210/656-659/CCLST

L6 28 S L5 NOT L3

L7 12 S L5 NOT L2

L8 20 S L1 AND 210/635/CCLST

=> s 18 not 17

L9 15 L8 NOT L7

=> s 19 not 12

L10 4 L9 NOT L2

=> d 1-4

1. 4,312,727, Jan. 26, 1982, Glyoxal agarose and zonal immobilization of proteins therewith; John R. Shainoff, 204/469; **210/635**; 252/315.3; 436/177, 516 [IMAGE AVAILABLE]

2. 3,962,206, Jun. 8, 1976, Gel chromatography process for fractionating ionic polymers; George B. Butler, **210/635**; 521/25 [IMAGE AVAILABLE]

3. 3,837,217, Sep. 24, 1974, MEASUREMENT OF POLYMER **MOLECULAR** **WEIGHT** **DISTRIBUTION**; Wolfgang W. Schulz, 73/61.52; **210/635**; 436/2, 85 [IMAGE AVAILABLE]

4. 3,657,117, Apr. 18, 1972, GEL CHROMATOGRAPHY; Klaus Pfitzner, et al., **210/635** [IMAGE AVAILABLE]

=> d kwic 1-4

US PAT NO: 4,312,727 [IMAGE AVAILABLE]

L10: 1 of 4

US-CL-CURRENT: 204/469; **210/635**; 252/315.3; 436/177, 516

DETDESC:

DETD(23)

Cascade immunoelectrophoretic analysis of the **molecular** **weight** **distribution** of fibrinogen related antigens in the plasma fibrinogen sample. The plasma proteins together with a fluorescent labelled ribonuclease marker were. . .

US PAT NO: 3,962,206 [IMAGE AVAILABLE]

L10: 2 of 4

US-CL-CURRENT: **210/635**; 521/25

SUMMARY:

BSUM(8)

The . . . method has proved to be very useful for the fractionation of polymers. The method has been used to determine the **molecular** **weight** **distribution** of various polymer systems or for the preparation of fractions of polymer systems with well-defined **molecular** **weight** **distributions**. Because of the high resolving power, speed and possibility of a high degree of automation, gel permeation chromatography is the. . .

US PAT NO: 3,837,217 [IMAGE AVAILABLE] L10: 3 of 4
TITLE: MEASUREMENT OF POLYMER **MOLECULAR** **WEIGHT**
DISTRIBUTION
US-CL-CURRENT: 73/61.52; **210/635**; 436/2, 85

ABSTRACT:

For use with a gel permeation chromatograph measuring **molecular** **weight** **distribution** of polymeric materials, the combination of a piezoelectric crystal detector for measuring mass with an automatic viscometer for inferential measurement of molecular weight provides improved measurement of absolute **molecular** **weight** **distribution** of polymeric materials. Recycling of polymer fractions through the gel permeation chromatograph provides improved resolution of the individual fractions.

SUMMARY:

BSUM(2)

Measurement of the **molecular** **weight** **distribution** of high molecular weight polymers is of particular interest because the physical properties of the polymers are related thereto. In. . . weight polymer present. By detecting the amount and the molecular weight of fractions of the effluent from the chromatograph, the **molecular** **weight** **distribution** of a polymer mixture may be obtained.

SUMMARY:

BSUM(3)

The technique most commonly used in the prior art for measuring the **molecular** **weight** **distribution** used two detectors, neither of which gives a direct measurement of the variables, molecular weight and quantity. A measurement of. . .

SUMMARY:

BSUM(6)

A recent improvement in the measurement of **molecular** **weight** **distribution** is described in the Journal of Polymer Science, A-2, Vol. 8, page 1227 (1970). This improved technique is to add. . .

SUMMARY:

BSUM(7)

It is, in general, desirable to make a direct measurement of **molecular** **weight** **distribution**. This would minimize the calibration difficulties, make possible measurement of unknown polymers, give more accurate results, and finally, would permit correlation with other techniques of measuring **molecular** **weight** **distribution**. The present invention, which comprises a significant improvement over the prior art, makes possible a closer approach than has heretofore been possible to a direct measurement of **molecular** **weight** **distribution**.

SUMMARY:

BSUM(9)

Improved measurement of the **molecular** **weight** **distribution** of polymers is obtained by a novel detector package for a gel permeation chromatograph. A polymer which has been separated . . . change in vibrational frequency of the crystal. Combining the polymer mass of each fraction and the molecular weight yields the **molecular** **weight** **distribution**. Owing to the imprecise separation of the columns presently available, it is necessary to recycle the first fractions through the . . .

DRAWING DESC:

DRWD(3)

FIG. 1 illustrates schematically the process of the present invention including the measurements and subsequent calculational processes by which the **molecular** **weight** **distribution** of polymers is determined; and

DETDESC:

DETD(19)

The . . . and solvent. The resulting molecular weight may then be combined with the weight corresponding to that fraction to prepare a **molecular** **weight** **distribution** curve corresponding to the polymer which has been analyzed. This typical curve is illustrated schematically as 38.

CLAIMS:

CLMS(1)

What is claimed is:

1. A method of determining the absolute **molecular** **weight** **distribution** of polymeric materials as they are eluted from a gel permeation chromatographic column by a solvent comprising the following steps: . . .
for each of said portions the molecular weight of step (i) with the mass of step (b) to obtain the **molecular** **weight** **distribution** of said polymer.

CLAIMS:

CLMS(3)

3. An apparatus for determining the **molecular** **weight** **distribution** of polymeric materials as they are eluted from a gel permeation chromatographic column by a solvent comprising:
a. a calibrated. . .

CLAIMS:

CLMS(4)

4. The apparatus of claim 3 further comprising means for calculating the **molecular** **weight** **distribution** of said polymer.

US PAT NO: 3,657,117 [IMAGE AVAILABLE]
US-CL-CURRENT: **210/635**

L10: 4 of 4

DETDESC:

DETD(57)

Special uses of the new gels are, for example, the determination of the **molecular** **weight** **distribution** of polymers. In the oligomeric range, substances can be isolated with molecular uniformity. Thus, for example, oligophenlenes, oligourethanes, oligoethylene glycols. . . separated into fractions of molecular uniformity. In the case of polymers, for example polystyrene, polyvinyl acetate or polyvinyl chloride, the **molecular** **weight** **distribution** can be determined, or fractions with only a slight non-uniformity can be obtained on a preparative scale.

=> d his

(FILE 'USPAT' ENTERED AT 15:21:58 ON 04 OCT 96)
L1 7700 S MOLECULAR(W) WEIGHT? (W) DISTRIBUTION?
L2 22 S L1 AND 210/198.2/CCLST
L3 1 S 5354852/PN
L4 0 S L1 AND L3
L5 28 S L1 AND 210/656-659/CCLST
L6 28 S L5 NOT L3
L7 12 S L5 NOT L2
L8 20 S L1 AND 210/635/CCLST
L9 15 S L8 NOT L7
L10 4 S L9 NOT L2
=> s l1 and 536/clas
17600 536/CLAS
L11 88 L1 AND 536/CLAS
=> s l11 and chromatogra?
116979 CHROMATOGRA?
L12 69 L11 AND CHROMATOGRA?
=> s support?
L13 904350 SUPPORT?s l11 and l13
s l11 and l13
=> s l11 and l13
L14 20 L11 AND L13
=> d 1-20

1. 5,545,553, Aug. 13, 1996, Glycosyltransferases for biosynthesis of oligosaccharides, and genes encoding them; Emil C. Gotschlich, 435/252.33, 72, 172.3, 243, 320.1; **536/23.2** [IMAGE AVAILABLE]

2. 5,536,826, Jul. 16, 1996, Process for preparing amino-functional cyclodextrin derivative; Rolf Hirsenkorn, **536/103**, **107**, **115**, **124** [IMAGE AVAILABLE]

3. 5,443,750, Aug. 22, 1995, Detergent compositions with high activity cellulase and softening clays; Andre Convents, et al., 510/322; 435/69.1, 209, 252.3, 265; 510/305, 308, 321, 323, 334, 347, 392, 507, 530;

536/23.2, 935/14, 68 [IMAGE AVAILABLE]

4. 5,370,871, Dec. 6, 1994, Therapeutic suppression of specific immune responses by administration of oligomeric forms of antigen of controlled chemistry; Howard M. Dintzis, et al., 424/244.1, 184.1; 514/2, 23, 25; 530/412, 413, 807; **536/123.1** [IMAGE AVAILABLE]

5. 5,316,926, May 31, 1994, Method for the microbiological production of non-antigenic hyaluronic acid; Karen K. Brown, et al., 435/101, 172.1, 253.4, 885; **536/55.1**, **124** [IMAGE AVAILABLE]

6. 5,314,996, May 24, 1994, Isolated nucleotide sequences encoding an antigen binding site of monoclonal antibody PD41; and antigen associated with prostate adenocarcinomas; George L. Wright, Jr., 530/387.3; 435/70.21, 172.2, 240.27; 530/350, 387.1, 388.15, 388.22, 388.8, 395; **536/23.5**, **23.53** [IMAGE AVAILABLE]

7. RE 34,457, Nov. 30, 1993, Separating agent; Yoshio Okamoto, et al., 210/198.2, 502.1, 635, 656; 502/404; **536/63**, **64** [IMAGE AVAILABLE]

8. 5,057,518, Oct. 15, 1991, Pharmaceutical preparations; Henrich H. Paradies, 514/23, 269, 274, 936, 937, 970, 975; **536/2**, **3**; 544/242, 312, 313, 315, 317, 406; 546/265, 270.7, 271.4, 274.7, 275.4, 294, 341, 347, 348; 548/178, 202, 304.4, 335.1, 347.1, 373.1 [IMAGE AVAILABLE]

9. 4,966,892, Oct. 30, 1990, Processes for preparation of aloe products products produced thereby and compositions thereof; Bill H. McAnalley, 514/54; 424/195.1, DIG.13; 426/72, 590, 615; **536/102**, **123**, **124** [IMAGE AVAILABLE]

10. 4,957,907, Sep. 18, 1990, Process for preparation of aloe products; Bill H. McAnalley, 514/54; **536/4.1**, **123** [IMAGE AVAILABLE]

11. 4,874,850, Oct. 17, 1989, Pharmaceutical preparations; Henrich H. Paradies, **536/3**, 546/290, 321, 347; 548/178, 304.4, 335.1, 370.7, 373.1 [IMAGE AVAILABLE]

12. 4,851,224, Jul. 25, 1989, Process for preparation of aloe products; Bill H. McAnalley, 424/195.1, DIG.13; 514/53, 847; **536/53**, **123** [IMAGE AVAILABLE]

13. 4,818,394, Apr. 4, 1989, Separating agent; Yoshio Okamoto, et al., 210/198.2, 502.1, 635, 656; 502/404; **536/63**, **64** [IMAGE AVAILABLE]

14. 4,782,046, Nov. 1, 1988, Ultrapure hyaluronic acid and method of making it; Karen K. Brown, et al., 514/54; **536/55.1** [IMAGE AVAILABLE]

15. 4,735,935, Apr. 5, 1988, Process for preparation of aloe products products, produced thereby and compositions thereof; Bill H. McAnalley, 514/53; 424/DIG.13; 514/54, 847; **536/53**, **123** [IMAGE AVAILABLE]

16. 4,424,346, Jan. 3, 1984, Derivatives of chitins, chitosans and other polysaccharides; Laurance D. Hall, et al., **536/20** [IMAGE AVAILABLE]

17. 4,370,472, Jan. 25, 1983, Plasma expander; Toshiji Igarashi, et al., 514/54, 23; **536/123.12** [IMAGE AVAILABLE]

18. 4,275,196, Jun. 23, 1981, Glyoxal agarose; John R. Shainoff,
536/115; 204/469; 252/315.3; 436/516; **536/116**, **120** [IMAGE
AVAILABLE]

19. 4,202,966, May 13, 1980, Glucan polysaccharide; Akira Misaki, et
al., **536/123.12**; 264/7; 435/101; **536/120** [IMAGE AVAILABLE]

20. 4,189,474, Feb. 19, 1980, Dextrin hydroxycarboxylato polyiron (III)
olated complex and process for the manufacture thereof; Teikichi
Kurosaki, et al., 514/58, 814; **536/103**, **113** [IMAGE AVAILABLE]
=> d kwic 1-20

US PAT NO: 5,545,553 [IMAGE AVAILABLE] L14: 1 of 20
US-CL-CURRENT: 435/252.33, 72, 172.3, 243, 320.1; **536/23.2**

GOVT-INT:

The research leading to the present invention was **supported** in part
with funds from grant number AI-10615 from the Public Health Service.
Accordingly, the Government may have certain rights. . .

SUMMARY:

BSUM(6)

The . . . lacto-N-neotetraose (Yamasaki et al., 1993, J. Bacteriol. 175:4565). The levels of CMP-NANA found in various host environments is sufficient to **support** this reaction (Apicella et al., 1990, J. Infect. Dis. 162:506). The sialylation of the LOS causes gonococci to become resistant. . .

SUMMARY:

BSUM(28)

In . . . or a functionally active fragment thereof. The invention further contemplates a composition comprising a glycosyltransferase conjugated to a solid phase **support**, wherein the glycosyltransferase is selected from the group consisting of a glycosyltransferase having an amino acid sequence of SEQ ID. . .

DETDESC:

DETD(45)

According to the invention, the glycosyltransferase enzymes can be covalently or non-covalently immobilized on a solid phase **support** such as SEPHADEX, SEPHAROSE, or poly(acrylamide-co-N-acryloxyuccimide) (PAN) resin. A specific reaction can be performed in an isolated reaction solution, with. . . products. Immobilization of the enzyme also allows for a continuous biosynthetic stream, with the specific glycosyltransferases attached to a solid **support**, with the **supports** arranged randomly or in distinct zones in the specified order in a column, with passage of the reaction solution through. . . column and elution of the desired oligosaccharide at the end. An efficient method for attaching the glycosyltransferase to a solid **support** and using such immobilized glycosyltransferases is described in U.S. Pat. No. 5,180,674, issued Jan. 19, 1993 to Roth, which is. . .

DETDESC:

DETD(99)

The . . . (a deletion of the locus with the exception of lgtE) gives rise to a LOS that is one step larger, **supporting** the idea that this gene accounts for the initial biosynthetic step. Note that the LOS of both I2 and .DELTA.4. . .

DETDESC:

DETD(100)

The . . . indicating that the first galactose residue is present. This is in keeping with the SDS-PAGE results (see FIG. 6) and **supports** the role of lgtE as the galactosyl transferase. It also indicates that deletions upstream of lgtE do not significantly inactivate. . .

DETDESC:

DETD(101)

The . . . 7 are in accord with the immunological data. This conclusion suggests that lgtC encodes the .alpha.-Gal transferase. This is further **supported** by the weak reactivity of mutant .DELTA.3 with antibody L1. Mutant .DELTA.3 has a deletion of lgtD and fails to. . .

DETDESC:

DETD(107)

While . . . more subtle regulation of the level of expression of the genes. It has been demonstrated that growth rate affects the **molecular** **weight** **distribution** and antigenic character LOS species produced (Morse et al., 1983, Infect. Immun. 41:74). While I have not determined the size. . .

US PAT NO: 5,536,826 [IMAGE AVAILABLE] L14: 2 of 20
US-CL-CURRENT: **536/103**, **107**, **115**, **124**

SUMMARY:

BSTU(11)

An . . . be prepared by this process, in which the CD's possess advantageous properties, especially also as regards attaching to a polymeric **support**.

SUMMARY:

BSTU(57)

The CD derivatives according to the invention have the advantage that their fixture to a **support** is not sterically hindered. In addition to this, the derivatives which are linked to a **support** are also found to be very capable of forming complexes.

SUMMARY:

BSUM(58)

Suitable **supports** are, preferably, polymers having acidic or reactive groups. Examples of such **supports** are acidic ion exchangers or polymers containing oxirane groups.

SUMMARY:

BSUM(60)

Because of the nucleophilic character, the derivatives according to the invention can also be used for covalent binding to reactive **supports**, which are understood to mean, in particular, **supports** having functional groups, such as, for example, halogen, epoxy or aldehyde radicals, or activated carboxylic acid derivatives (ester, halides or imidazolide). They can be immobilized, for example, on a reactive **support** sold under the trademark Eupergit.RTM. (process for this described in K. Laumen, E. H. Reimerdes, M. Schneider, Tetrahedron Letters 26. . . .

SUMMARY:

BSUM(61)

When being linked covalently or ionically via the amine function to the above-mentioned **support**, the CD is only linked via one arm, and the CD cavity is consequently more readily available for forming complexes. . . two or three linkages by several arms. In addition, crosslinking reactions are avoided in association with linkage to the said **supports**.

SUMMARY:

BSUM(62)

Consequently, . . . can be modified with the amino-functional CD derivatives according to the invention. The CD derivatives which are thus fixed to **supports** can then, likewise, be used for all applications which are known for cyclodextrins and their derivatives.

DETDESC:

DETD(12)

The . . . means of f.a.b. mass spectroscopy. The percentage frequency distribution of the molecular weights is given in Table 1. The percentage **molecular** **weight** **distribution** as calculated for a statistical distribution at an MS of 0.12 is also given for comparison.

DETDESC:

DETD(59)

Removal of CD's which are not amino-functionalized and reversible immobilization of the CD's according to the invention on an acidic **support**

US PAT NO: 5,443,750 [IMAGE AVAILABLE] L14: 3 of 20
US-CL-CURRENT: 510/322; 435/69.1, 209, 252.3, 265; 510/305, 308, 321,
323, 334, 347, 392, 507, 530; **536/23.2**; 935/14, 68

SUMMARY:

BSUM(150)

The most preferred polymer is poly-(ethylene-oxide). **Molecular**
weight **distributions** can be readily determined using gel
permeation chromatography, against standards of poly-(ethylene-oxide) of
narrow **molecular** **weight** **distributions**.

SUMMARY:

BSUM(176)

A suitable antisettling agent must provide a fully activated **support**
matrix to suspend particles within the liquid detergent composition.

DETDESC:

DETD(44)

Examples I and II **supports** the prior art theory of not creating an
adverse effect by combining softening clay with cellulase. However, the
result also. . .

US PAT NO: 5,370,871 [IMAGE AVAILABLE] L14: 4 of 20
US-CL-CURRENT: 424/244.1, 184.1; 514/2, 23, 25; 530/412, 413, 807;
536/123.1

SUMMARY:

BSUM(3)

There . . . are produced against self-antigens so that, in a sense,
the immune system is working against the body rather than in **support**
of it. Organ transplants, such as a replacement kidney or liver, present
other specific situations of undesired immune response where. . .

DETDESC:

DETD(66)

F1-polymers . . . 95 cm columns of Sepharose CL-2B, CL-4B and/or
CL-6B; center cuts were taken repeatedly to give preparations of
relatively narrow **molecular** **weight** **distributions**. F1 content
was determined by measuring optical density at 496 nm in 0.01M Na₂sub>2
B₄O₇ using a molar extinction. . .

US PAT NO: 5,316,926 [IMAGE AVAILABLE] L14: 5 of 20
US-CL-CURRENT: 435/101, 172.1, 253.4, 885; **536/55.1**, **124**

SUMMARY:

BSUM(10)

The . . . the natural death of cells in a growing culture. Furthermore, this CDM itself has limited utility because it will not **support** the growth of most streptococcal strains. The recovery of hyaluronic acid of a mean molecular weight of about 55,000 daltons. . .

DRAWING DESC:

DRWD(2)

FIGS. 1-4 are graphs showing HPLC determined **molecular** **weight** **distributions** (retention times) of HA made from four microbiological fermentations in accordance with the disclosures herein.

DRAWING DESC:

DRWD(3)

FIGS. 5-7 are graphs showing HPLC determined **molecular** **weight** **distributions** (retention times) of three commercially available prior art HA preparations.

DETDESC:

DETD(3)

A hyaluronic acid which has a high molecular weight, a narrow **molecular** **weight** **distribution** and a very high purity has also been developed. The process developments have enabled the recovery and purification of hyaluronic acid without the significant loss of molecular weight and without substantial broadening of the **molecular** **weight** **distribution**. A preferred hyaluronic acid is pyrogen free, has a single substantially symmetrical HPLC retention peak lying between retention times representative. . .

DETDESC:

DETD(84)

High . . . 1-4 at least about 98% of the HA molecules are within the single peaks shown. Such close control of high **molecular** **weight** **distribution** is not shown in existing commercial products as illustrated in FIGS. 5-7. FIG. 5 (Prior Art #1) illustrates the HPLC. . .

CLAIMS:

CLMS(1)

What is claimed is:

1. A process for the production of high molecular weight hyaluronic acid with a narrow **molecular** **weight** **distribution** comprising
 - a) increasing the virulence and the hyaluronic acid generating ability of an existing strain of *Streptococcus equi* by passaging. . .

DETDESC:

DETD(9)

Myeloma . . . are non-antibody-producing, have high fusion efficiency, and enzyme deficiencies that render them incapable of growing in certain selective media which **support** the growth of the desired hybridomas.

DETDESC:

DETD(26)

Data . . . evidence that MAb PD41 is distinct from other mucin-directed MAbs and that PMA is distinct from other mucin antigens. Additional **support** is provided by the inability of MAbs to other mucin-like TAAs to block PD41 binding to its target antigen. (See. . . .

DETDESC:

DETD(52)

In . . . isolated from extracts of prostate carcinoma either by affinity chromatography, in which the PD41 MAb is bound to a solid **support**, or by preparative SDS-polyacrylamide gel electrophoresis, in which gel slices containing PMA are identified by allowing labeled PD41 MAb to. . . .

DETDESC:

DETD(111)

Results of the lectin binding experiments (Table 8) **support** the glycoprotein nature of the PMA antigen. Only soy bean agglutinin (SBA), which has specificity for GalNAc, Gal, inhibited binding. . . .

DETDESC:

DETD(129)

Reactivity of MAb PDd41 with BSM was confirmed by immunoblotting which indicated a similar antigenic **molecular** **weight** **distribution** as that seen for the PMA antigen obtained from prostate carcinoma tissues. Results of biochemical and immunochemical experiments indicate that. . . .

US PAT NO: RE 34,457 [IMAGE AVAILABLE] L14: 7 of 20
US-CL-CURRENT: 210/198.2, 502.1, 635, 656; 502/404; **536/63**, **64**

SUMMARY:

BSUM(18)

In . . . be employed a method wherein the aromatic ring-containing cellulose derivative is packed into a column directly or in the form **supported** on a carrier or a method wherein a capillary column is

coated with said cellulose derivative.

SUMMARY:

BSUM(20)

It is preferred to **support** the aromatic ring-containing cellulose derivative on a carrier so as to improve the resistance thereof to pressure, to prevent swelling. . . . diameter of 10 .ANG. to 100 .mu.m, preferably 50 to 50,000 .ANG.. The amount of said cellulose derivative to be **supported** is 1 to 100 wt. %, preferably 5 to 50 wt. %, based on the carrier. The carrier is preferred. . . .

SUMMARY:

BSUM(21)

The aromatic ring-containing cellulose derivative may be **supported** on the carrier by either chemical or physical means. For example, the cellulose derivative is dissolved in a suitable solvent, . . . mixture is dispersed in a liquid incompatible with said solvent by stirring to diffuse the solvent. The cellulose derivative thus **supported** on the carrier may be crystallized, if necessary, by heat treatment or the like. Further, the state of the **supported** cellulose derivative and accordingly its resolving power can be modified by adding a small amount of a solvent thereto to. . . .

SUMMARY:

BSUM(25)

In of particles of about 0.1 .mu.m to 0.1 mm and a small amount of a binder is formed on a **supporting** plate.

DETDESC:

DETD(28)

140 . . . cellulose triacetate produced by an ordinary homogeneous acetylation process (number-average degree of polymerization as determined by vapor pressure osmometry: 110; **molecular** **weight** **distribution** $M_w/M_n=2.45$, free hydroxyl group content: 0.35%) was swollen in 1.4 l of acetic acid (a guaranteed reagent of Kanto Kagaku). . . .

DETDESC:

DETD(92)

1.2 . . . were impregnated with 7.5 ml of the resulting solution. The solvent was distilled off under reduced pressure to obtain powdery, **supported** material.

DETDESC:

DETD(108)

1.2 . . . were impregnated with 7.5 ml of the resulting solution. The

solvent was removed under reduced pressure to obtain a powdery, **supported** material.

DETDESC:

DETD(110)

1.2 . . . were impregnated with 7.5 ml of the resulting solution. The solvent was removed under reduced pressure to obtain a powdery, **supported** material.

DETDESC:

DETD(112)

Cellulose tris(4-chlorobenzoate) obtained in Synthesis Example 14 was **supported** on silica beads in the same manner as in Example 7 to obtain a powdery material.

DETDESC:

DETD(136)

1.2 . . . impregnated with 7.5 ml of the resulting solution. The solvent was distilled off under reduced pressure to obtain a powdery, **supported** material.

CLAIMS:

CLMS(1)

The . . .

alkynyl, nitro, halogen, amino, alkyl-substituted amino, cyano, hydroxyl, alkoxy, acyl, thiol, sulfonyl, carboxyl or alkoxy carbonyl, said cellulose derivative being **supported** on a porous carrier having a particle size of from 1 micron to 10 millimeters and a pore size of. . .

CLAIMS:

CLMS(3)

3. A separating agent as claimed in claim 1, wherein the amount of said cellulose derivative **supported** on said carrier is from 1-100 wt. % based on the weight of the carrier.

CLAIMS:

CLMS(10)

10. . . . alkoxy, acyl, thiol, sulfonyl, carboxyl or alkoxy carbonyl having a number average degree of polymerization in the range of 5-5000 **supported** on a solid carrier having a particle size of from 1 micron to 10 millimeters.

CLAIMS:

CLMS(15)

15. . . . carrier particles, wherein said carrier particles are from 1 .mu.m-10 mm in diameter and the amount of said cellulose derivative **supported** is from 1-100 wt. % based on the weight of the carrier particles.

CLAIMS:

CLMS(21)

21. . . . separation of a chemical substance from a mixture containing the same, the improvement comprising said column containing a carrier having **supported** thereon a separating agent selected from the group consisting of cellulose tribenzoate and cellulose tribenzoate ring-substituted with alkyl, alkenyl, alkynyl, . . . a degree of polymerization of from 5 to 5000..Iadd. .Iadd.27. The column of claim 26, wherein said separating agent is **supported** on a carrier..Iadd. .Iadd.28. The column of claim 26, wherein said separating agent has a particle size of about from. . .

US PAT NO: 5,057,518 [IMAGE AVAILABLE]

L14: 8 of 20

US-CL-CURRENT: 514/23, 269, 274, 936, 937, 970, 975; **536/2**; **3**;
544/242, 312, 313, 315, 317, 406; 546/265, 270.7, 271.4,
274.7, 275.4, 294, 341, 347, 348; 548/178, 202, 304.4,
335.1, 347.1, 373.1

SUMMARY:

BSUM(5)

The . . . times the critical cmc, although no protein-precipitating effect (denaturing) occurs, a reversible inactivation does take place of enzyme systems and **support** proteins by unfolding of the active three-dimensional structure ("loss of activity through unfolding").

SUMMARY:

BSUM(122)

As . . . above the (CH₂)_x chain with x=10-20 governs the size and the cmc in aqueous solutions. The resulting size, form and **molecular** **weight** **distribution** of the micelle in aqueous solution at pH 7.0 depend on the nature of the counter ion Y⁻.

SUMMARY:

BSUM(146)

These . . . the lowest cmc (it is about 2.5 . 10⁻⁷ mol/liter). They are furthermore very easy to control by Y⁻ (form, **molecular** **weight** **distribution**), polydispersity). Also, they are variable due to the size of the alkyl chain and thus as regards absorption of the . .

SUMMARY:

BSUM(150)

To . . . and isotropic aqueous solution of the N.sup.+ -tensides both as regards form (spherical, oval, elongated) and size and as regards **molecular** **weight** **distribution**, the solutions indicated, together with their included hydrophobic pharmaceutical active substances, must be

DETDESC:

DETD(31)

The shape, size and **molecular** **weight** **distribution** can be determined as in examples 1 and 2. The pyridinium amphiphile is prepared from the corresponding iodides with silver. . .

DETDESC:

DETD(68)

15 . . . or adding 2% (w/w) salicylate. The solutions thus made do not change their hydrodynamic radius, their partially specific volume or **molecular** **weight** **distribution** in the temperature range of 15.degree.-45.degree. C.

US PAT NO: 4,966,892 [IMAGE AVAILABLE] L14: 9 of 20
US-CL-CURRENT: 514/54; 424/195.1, DIG.13; 426/72, 590, 615; **536/102**,
123, **124**

DETDESC:

DETD(285)

The . . . Filter Model DE-48. The interstitial fibers themselves, instead of diatomaceous earth, were used as the filter media, the fibers being **supported** by a nylon mesh cloth filter **support**. The gel was pumped through the filter for several minutes before opening the exit port so that a sufficient amount. . .

DETDESC:

DETD(300)

The . . . Filter Model DE-48. The interstitial fibers themselves, instead of diatomaceous earth, were used as the filter media, the fibers being **supported** by a nylon mesh cloth filter **support**. The gel was then pumped through the filter for several minutes before opening the exit port so that a sufficient. . .

DETDESC:

DETD(454)

The average **molecular** **weight** **distribution** of CARRISYN.RTM. extract was determined by size exclusion Chromatography (SEC). The liquid Chromatograph was a Hewlett Packard.TM. model 1084 B. . . a temperature of 30.degree. C. Dextran standards from Sigma Chemical Company, St. Louis, Missouri were used to establish the average

molecular **weight** **distribution** as follows:

DETDESC:

DETD(460)

Based on the dextran standard, the average **molecular** **weight** **distribution** of the 3 fractions of CARRISYN.RTM. extract were as follows:

DETDESC:

DETD(462)

Only the average **molecular** **weight** **distribution** can be determined since dextrans and the polysaccharides of CARRISYN.RTM. extract may be physically and chemically different. For example, size.

US PAT NO: 4,957,907 [IMAGE AVAILABLE]
US-CL-CURRENT: 514/54; **536/4.1**, **123**

L14: 10 of 20

DETDESC:

DETD(52)

The . . . Filter Model DE-48. The interstitial fibers themselves, instead of diatomaceous earth, were used as the filter media, the fibers being **supported** by a nylon mesh cloth filter **support**. The gel was pumped through the filter for several minutes before opening the exit port so that a sufficient amount. . .

DETDESC:

DETD(68)

The . . . Filter Model DE-48. The interstitial fibers themselves instead of diatomaceous earth were used as the filter media, the fibers being **supported** by a nylon mesh cloth filter **support**. The gel was pumped through the filter for several minutes before opening the exit port so that a sufficient amount. . .

DETDESC:

DETD(148)

The object of the study is to determine the **molecular** **weight** **distribution** of acemannan by size exclusion chromatography.

DETDESC:

DETD(371)

(f) **Molecular** **Weight** **Distribution**:

US PAT NO: 4,874,850 [IMAGE AVAILABLE] L14: 11 of 20
US-CL-CURRENT: **536/3**; 546/290, 321, 347; 548/178, 304.4, 335.1,
370.7, 373.1

SUMMARY:

BSUM(5)

The . . . times the critical cmc, although no protein-precipitating effect (denaturing) occurs, a reversible inactivation does take place of enzyme systems and **support** proteins by unfolding of the active three-dimensional structure ("loss of activity through unfolding").

DETDESC:

DETD(81)

As . . . above the $(CH_2)_x$ chain with $x=10-20$ governs the size and the cmc in aqueous solutions. The resulting size, form and **molecular** **weight** **distribution** of the micelle in aqueous solution at pH 7.0 depend on the nature of the counter ion Y^{+} .

DETDESC:

DETD(104)

These . . . the lowest cmc (it is about $2.5 \cdot 10^{-7}$ mol/liter). They are furthermore very easy to control by Y^{+} (form, **molecular** **weight** **distribution**, polydispersity). Also, they are variable due to the size of the alkyl chain and thus as regards absorption of the . . .

DETDESC:

DETD(108)

To . . . and isotropic aqueous solution of the N^{+} -tensides both as regards form (spherical, oval, elongated) and size and as regards **molecular** **weight** **distribution**, the solutions indicated, together with their included hydrophobic pharmaceutical active substances, must be

DETDESC:

DETD(162)

The shape, size and **molecular** **weight** **distribution** can be determined as in examples 1 and 2. The pyridinium amphiphile is prepared from the corresponding iodides with silver. . . .

DETDESC:

DETD(189)

15 . . . adding 2% (.sup.w /w) salicylate. The solutions thus made do not change their hydrodynamic radius, their partially specific volume or **molecular** **weight** **distribution** in the temperature range of 15.degree.-45.degree. C.

DETDESC:

DETD(311)

The . . . times the critical cmc, although no protein-precipitating effect (denaturing) occurs, a reversible inactivation does take place of enzyme systems and **support** proteins by unfolding of the active three-dimensional structure ("loss of activity through unfolding").

DETDESC:

DETD(319)

their resulting low water solubility in the physiological pH range due to their lack of unity as regards size (**molecular** **weight** **distribution**) and form (polydispersity);

DETDESC:

DETD(408)

As . . . above the $(CH_{sub.2})_{sub.x}$ chain with $x=10-20$ governs the size and the cmc in aqueous solutions. The resulting size, form and **molecular** **weight** **distribution** of the micelle in aqueous solution at $pH \geq 7.0$ to 8.0 depend on the nature of the counter ion $Y^{sup.-}$.

DETDESC:

DETD(441)

These . . . the lowest cmc (it is about $0.8 \cdot 10^{-7}$ mol/liter). They are furthermore very easy to control by $Y^{sup.-}$ (form, **molecular** **weight** **distribution**, polydispersity). Also, they are variable due to the size of the alkyl chain and thus as regards absorption of the . . .

DETDESC:

DETD(445)

To . . . and isotropic aqueous solution of the $N^{sup.+}$ -tensides both as regards form (spherical, oval, elongated) and size and as regards **molecular** **weight** **distribution**, the solutions indicated, together with their included hydrophobic linear and cyclic peptides and peptide analogs must be

DETDESC:

DETD(500)

It . . . dNTPs. The linear and cyclic gramicidins and analogs do not exhibit these phenomena. The activity of the HSV polymerase is **supported** by poly-dC: dG $_{sub.12-18}$ -templates but is stimulated by a protein which bonds specifically to the single strand: after SDS polyacrylamide. . .

DETDESC:

DETD(52)

The . . . Filter Model DE-48. The interstitial fibers themselves instead of diatomaceous earth were used as the filter media, the fibers being **supported** by a nylon mesh cloth filter **support**. The gel was pumped through the filter for several minutes before opening the exit port so that a sufficient amount. . .

DETDESC:

DETD(68)

The . . . Filter Model DE-48. The interstitial fibers themselves instead of diatomaceous earth were used as the filter media, the fibers being **supported** by a nylon mesh cloth filter **support**. The gel was then pumped through the filter for several minutes before opening the exit port so that a sufficient. . .

DETDESC:

DETD(148)

The object of the study is to determine the **molecular** **weight** **distribution** of acemannan by size exclusion chromatography.

DETDESC:

DETD(370)

(f) **Molecular** **Weight** **Distribution**;

US PAT NO: 4,818,394 [IMAGE AVAILABLE] L14: 13 of 20
US-CL-CURRENT: 210/198.2, 502.1, 635, 656; 502/404; **536/63**, **64**

SUMMARY:

BSUM(18)

In . . . be employed a method wherein the aromatic ring-containing cellulose derivative is packed into a column directly or in the form **supported** on a carrier or a method wherein a capillary column is coated with said cellulose derivative.

SUMMARY:

Bsum(20)

It is preferred to **support** the aromatic ring-containing cellulose derivative on a carrier so as to improve the resistance thereof to pressure, to prevent swelling. . . diameter of 10 .ANG. to 100 .mu.m, preferably 50 to 50,000 .ANG.. The amount of said cellulose derivative to be **supported** is 1 to 100 wt. %, preferably 5 to 50 wt. %, based on the carrier. The carrier is preferred. . .

SUMMARY:

BSUM(21)

The aromatic ring-containing cellulose derivative may be **supported** on the carrier by either chemical or physical means. For example, the cellulose derivative is dissolved in a suitable solvent, . . . mixture is dispersed in a liquid incompatible with said solvent by stirring to diffuse the solvent. The cellulose derivative thus **supported** on the carrier may be crystallized, if necessary, by heat treatment or the like. Further, the state of the **supported** cellulose derivative and accordingly its resolving power can be modified by adding a small amount of a solvent thereto to. . .

SUMMARY:

BSUM(25)

In . . . of particles of about 0.1 .mu.m to 0.1 mm and a small amount of a binder is formed on a **supporting** plate.

DETDESC:

DETD(28)

140 . . . cellulose triacetate produced by an ordinary homogeneous acetylation process (number-average degree of polymerization as determined by vapor pressure osmometry: 110; **molecular** **weight** **distribution** $M_w/M_n=2.45$, free hydroxyl group content: 0.35%) was swollen in 1.4 l of acetic acid (a guaranteed reagent of Kanto Kagaku).

DETDESC:

DETD(92)

1.2 . . . were impregnated with 7.5 ml of the resulting solution. The solvent was distilled off under reduced pressure to obtain powdery, **supported** material.

DETDESC:

DETD(108)

1.2 . . . were impregnated with 7.5 ml of the resulting solution. The solvent was removed under reduced pressure to obtain a powdery, **supported** material.

DETDESC:

DETD(110)

1.2 . . . were impregnated with 7.5 ml of the resulting solution. The solvent was removed under reduced pressure to obtain a powdery, **supported** material.

DETDESC:

DETD(112)

Cellulose tris(4-chlorobenzoate) obtained in Synthesis Example 14 was **supported** on silica beads in the same manner as in Example 7 to obtain a powdery material.

DETDESC:

DETD(136)

1.2 . . . impregnated with 7.5 ml of the resulting solution. The solvent was distilled off under reduced pressure to obtain a powdery, **supported** material.

CLAIMS:

CLMS(1)

The . . .

alkynyl, nitro, halogen, amino, alkyl-substituted amino, cyano, hydroxyl, alkoxy, acyl, thiol, sulfonyl, carboxyl or alkoxy carbonyl, said cellulose derivative being **supported** on a porous carrier having a particle size of from 1 micron to 10 millimeters and a pore size of . . .

CLAIMS:

CLMS(3)

3. A separating agent as claimed in claim 1, wherein the amount of said cellulose derivative **supported** on said carrier is from 1-100 wt.% based on the weight of the carrier.

CLAIMS:

CLMS(10)

10. . . . alkoxy, acyl, thiol, sulfonyl, carboxyl or alkoxy carbonyl having a number average degree of polymerization in the range of 5-5000 **supported** on a solid carrier having a particle size of from 1 micron to 10 millimeters.

CLAIMS:

CLMS(15)

15. . . . solid carrier particles, wherein said carrier particles from 1 .mu.m-10 mm in diameter and the amount of said cellulose derivative **supported** is from 1-100 wt.% based on the weight of the carrier particles.

US PAT NO: 4,782,046 [IMAGE AVAILABLE]
US-CL-CURRENT: 514/54; **536/55.1**

L14: 14 of 20

SUMMARY:

BSUM(10)

The . . . Sect. B, 84:162-164, 1976) uses a media and process which are unacceptable for some purposes. The described media will not **support** growth of most Streptococci. The described process begins with heat killing the Streptococci. This extracts the organisms, releasing numerous internal. . . .

DRAWING DESC:

DRWD(2)

FIGS. 5-7 are graphs showing **molecular** **weight** **distributions** of three commercially available prior art HA preparations.

DRAWING DESC:

DRWD(3)

FIGS. 1-4 are graphs showing **molecular** **weight** **distributions** of HA made from four microbiological fermentations in accordance with the disclosures herein.

DETDESC:

DETD(4)

As . . . weight range (preferably from about 2.0 million (MM) to about 4.0 MM, and represented by an essentially single, substantially symmetrical **molecular** **weight** **distribution** peak via the HPLC technique described below). Hyaluronidase-negative means that no measurable amounts of extracellular hyaluronidase (able to degrade HA).

DETDESC:

DETD(62)

High . . . 1-4 at least about 98% of the HA content is within the single peaks shown. Such close control of high **molecular** **weight** **distribution** is not shown in existing commercial products as illustrated in FIGS. 5-7. FIG. 5 (Prior Art #1) illustrates the HPLC.

US PAT NO: 4,735,935 [IMAGE AVAILABLE] L14: 15 of 20
US-CL-CURRENT: 514/53; 424/DIG.13; 514/54, 847; **536/53**, **123**

DETDESC:

DETD(281)

The . . . Filter Model DE-48. The interstitial fibers themselves instead of diatomaceous earth were used as the filter media, the fibers being **supported** by a nylon mesh cloth filter **support**. The gel was pumped through the filter for several minutes before opening the exit port so that a sufficient amount. . . .

DETDESC:

DETD(297)

The . . . Filter Model DE-48. The interstitial fibers themselves instead of diatomaceous earth were used as the filter media, the fibers being **supported** by a nylon mesh cloth filter **support**. The gel was then pumped through the filter for several minutes before opening the exit port so that a sufficient. . . .

DETDESC:

DETD(459)

The average **molecular** **weight** **distribution** of Carrisyn.TM. was determined by size exclusion Chromatography (SEC). The liquid Chromatograph was a Hewlett Packard model 1084 B featuring. . . a temperature of 30.degree. C. Dextran standards from Sigma Chemical Company, St. Louis, Mo. were used to establish the average **molecular** **weight** **distribution** as follows:

DETDESC:

DETD(465)

Based on the dextran standard, the average **molecular** **weight** **distribution** of the 3 fractions of Carrisyn.TM. were as follows:

DETDESC:

DETD(467)

Only the average **molecular** **weight** **distribution** can be determined since dextrans and the polysaccharides of Carrisyn.TM. may be physically and chemically different. For example, size separation. . . .

US PAT NO: 4,424,346 [IMAGE AVAILABLE]

L14: 16 of 20

US-CL-CURRENT: **536/20**

SUMMARY:

BSUM(4)

Chitin . . . plant and, to an even greater extent, animal kingdom, where its main function is the provision of structural and skeletal **support**. Chitin is found most abundantly in fungi, while chitosan is obtained mainly by N-deacetylation of chitin, but also occurs in. . . .

SUMMARY:

BSUM(8)

Natural . . . other factors such as ionic charges, structural irregularities, glycosidic linkages which preclude ribbon structures, low molecular weight, and a wide **molecular** **weight** **distribution**. The possibility of modifying polysaccharide solubility by chemical derivatization is a relatively novel concept which is gaining increasing importance for. . . .

SUMMARY:

BSUM(11)

The application of polymers as **support** matrices for chelation, clinical use, catalysis, as well as for synthesis has grown rapidly since their use in peptide synthesis. . .

DETDESC:

DETD(107)

Other . . . treatment, recovery of trace metals (such as U) from sea water, blood decontamination from radionuclides (such as plutonium), and as **supports** or carriers for new metal-containing drugs.

US PAT NO: 4,370,472 [IMAGE AVAILABLE]

L14: 17 of 20

US-CL-CURRENT: 514/54, 23; **536/123.12**

ABSTRACT:

Novel plasma expander which consists of a refined pullulan having a narrow **molecular** **weight** **distribution** falling within the range of from 30,000 to 90,000; preparation of said plasma expander in a form suitable for intravenous. . . in surgical operation and prevention of hemorrhage; and isolation of said refined pullulan from the conventional pullulan which possesses the **molecular** **weight** **distribution** broader than that mentioned above.

SUMMARY:

BSUM(1)

This invention relates to a plasma expander, the colloidal component of which consists of a refined pullulan having a specifically confined **molecular** **weight** **distribution** falling within the range of from 30,000 to 90,000.

SUMMARY:

BSUM(23)

The particular pullulan having the formerly defined narrow **molecular** **weight** **distribution** in the present invention can be obtained either by adequately controlling the working conditions in the step of cultivation in. . .

SUMMARY:

BSUM(25)

This . . . the above-mentioned water-miscible organic solvents to an about 5-20% aqueous solution of a commercially available pullulan, for example, having a **molecular** **weight** **distribution** broader than that of the refined pullulan specified in the present invention, to produce an aqueous mixture which contains approximately. . .

DRAWING DESC:

DRWD(5)

FIG. 3 graphically shows the **molecular** **weight** **distributions** of three particular pullulans to be used for the animal test in order to inspect their molecular degradation and/or decomposition.

DRAWING DESC:

DRWD(6)

FIG. 4 graphically shows the **molecular** **weight** **distributions** of the polysaccharides contained in the urines excreted for 24 hours from the rabbits to which the three specified pullulan.

DETDESC:

DETD(14)

Based . . . as control, which contained respectively Dex-40 and H E S-200. The pullulans contained in the former preparations possess the narrower **molecular** **weight** **distributions**, especially compared to that of H E S-200.

DETDESC:

DETD(27)

The **molecular** **weight** **distributions** of said three pullulan fractions contained in said three pullulan preparations are shown in FIG. 3, whereas the **molecular** **weight** **distributions** of the polysaccharides recovered from the urines were shown in FIG. 4.

DETDESC:

DETD(44)

In view of the **molecular** **weight** **distributions** of the polysaccharides respectively recovered from the abovementioned incubation liquors of Pul-40 and Dex-40, which were established on the basis.

DETDESC:

DETD(45)

The above considerations **support** the foregoing presumption about the metabolism and decomposition of the pullulan defined in the present invention.

CLAIMS:

CLMS(1)

What is claimed is:

1. A sterile, isotonic solution containing 4 to 10% w/v of a refined pullulan having a **molecular** **weight** **distribution** within the range of from 30,000 to 90,000.

CLAIMS:

CLMS(2)

2. . . . solution as claimed in claim 1, prepared by a process which comprises:

- (1) dissolving in water a pullulan having a **molecular** **weight** **distribution** outside the range of from 30,000 to 90,000,
- (2) adding to the resulting aqueous solution a water-miscible organic solvent in an. . . the lower layer from step (4),
- (6) isolating a refined pullulan from the recovered lower layer, said refined pullulan having a **molecular** **weight** **distribution** within the range of from 30,000 to 90,000,
- (7) dissolving said refined pullulan in physiological saline to produce an isotonic solution. . .

CLAIMS:

CLMS(3)

3. . . . process for preparing a solution as claimed in claim 1 which comprises:

- (1) dissolving in water a pullulan having a **molecular** **weight** **distribution** outside the range of from 30,000 to 90,000,
- (2) adding to the resulting aqueous solution a water-miscible organic solvent in an. . . the lower layer from step (4),
- (6) isolating a refined pullulan from the recovered lower layer, said refined pullulan having a **molecular** **weight** **distribution** within the range of from 30,000 to 90,000,
- (7) dissolving said refined pullulan in physiological saline to produce an isotonic solution. . .

US PAT NO: 4,275,196 [IMAGE AVAILABLE]

L14: 18 of 20

US-CL-CURRENT: **536/115**; 204/469; 252/315.3; 436/516; **536/116**,
120

SUMMARY:

BSTU(2)

The illustrative antigens, antibodies, enzymes, etc., on gel structures has been described in the art. Gels are also widely used as **support** matrices for separating proteins by electrophoresis. However, no single gel developed heretofore could be used for both separating and immobilizing. . . .

SUMMARY:

BSTU(3)

The rapidly react with protein amino groups to form Schiff-base linkages. The inertness enables it to be used as a gel **support** for separating protein without binding at neutral pH, and high reactivity enables it to bind and immobilize the separated proteins. . . .

DETDESC:

DETID(22)

Cascade immunoelectrophoretic analysis of the **molecular** **weight**

distribution of fibrinogen related antigens in the plasma fibrinogen sample. The plasma proteins together with a fluorescent labelled ribonuclease marker were. . .

US PAT NO: 4,202,966 [IMAGE AVAILABLE] L14: 19 of 20
US-CL-CURRENT: **536/123.12**; 264/7; 435/101; **536/120**

DRAWING DESC:

DRWD(3)

FIG. 2 shows the **molecular** **weight** **distribution** of the purified elsinan by the gel filtration method.

DETDESC:

DETD(37)

The . . . % aqueous solution of the purified elsinan determined at 30.degree.C., using Brookfield rotational viscometer, was 407 cps. The estimation of **molecular** **weight** **distribution** of the purified elsinan by the gel filtration method gave a distribution range from approx. 10,000to approx. 10,000,000 or more, . . .

DETDESC:

DETD(38)

A . . . of the purified elsinan was casted uniformly on a clear glass plate and air-dried. A colorless, clear, intensive, flexible and self-**supporting** film was formed. The excellent film formability of elsinan leads to the applications as packaging film material and coating agent.

US PAT NO: 4,189,474 [IMAGE AVAILABLE] L14: 20 of 20
US-CL-CURRENT: 514/58, 814; **536/103**, **113**

DETDESC:

DETD(21)

The . . . a negative charge. Its average molecular weight, as measured from the osmotic pressure, is about 140,000, and has a particular **molecular** **weight** **distribution**.

DETDESC:

DETD(78)

The . . . (III) olated complex which is stable and dispersible in water. The complex has a high molecular weight with a particular **molecular** **weight** **distribution** and contains a small amount of free dextrin.

DETDESC:

DETD(92)

The results in FIG. 1 and Table V **support** the theory that complexes

according to the present invention, contain a coordinate bond of polyiron (III) olated complex with dextrin.

DETDESC:

DETD(110)

In accordance with JIS-K0111, 5 ml of **supporting** electrolyte (Walpole's buffer solution pH 3.50, 4.50, 5.45) was deposited in an electrolysis vessel, to which was added 20 .mu.l.

=>

In accordance with JIS-KO111, 5 ml of **supporting** electrolyte (Walpole's buffer solution pH 3.50, 4.50, 5.45) was deposited in an electrolysis vessel, to which was added 20 .mu.l.
=> s separat?(a)agent?

1090968 SEPARAT?
362160 AGENT?

L15 1682 SEPARAT? (A)AGENT?

=> d his

(FILE 'USPAT' ENTERED AT 15:21:58 ON 04 OCT 96)
L1 7700 S MOLECULAR(W)WEIGHT? (W)DISTRIBUTION?
L2 22 S L1 AND 210/198.2/CCLST
L3 1 S 5354852/PN
L4 0 S L1 AND L3
L5 28 S L1 AND 210/656-659/CCLST
L6 28 S L5 NOT L3
L7 12 S L5 NOT L2
L8 20 S L1 AND 210/635/CCLST
L9 15 S L8 NOT L7
L10 4 S L9 NOT L2
L11 88 S L1 AND 536/CLAS
L12 69 S L11 AND CHROMATOGRAD?
L13 904350 S SUPPORT?
L14 20 S L11 AND L13
L15 1682 S SEPARAT? (A)AGENT?

=> s l11 and l15

L16 6 L11 AND L15

=> d 1-6

1. 5,543,162, Aug. 6, 1996, Polymeric capsules, method of making the same, and foodstuffs containing the same; Maritta Timonen, et al., 426/89; 127/37; 426/48, 658, 801; **536/56**, **84** [IMAGE AVAILABLE]

2. RE 34,457, Nov. 30, 1993, **Separating** **agent**; Yoshio Okamoto, et al., 210/198.2, 502.1, 635, 656; 502/404; **536/63**, **64** [IMAGE AVAILABLE]

3. 5,136,032, Aug. 4, 1992, Method for separating phosphopolyol compounds using a **separating** **agent**; Shinji Nagamatsu, et al., **536/18.7**; 210/500.37, 500.38, 651, 654; **536/4.1**, **123** [IMAGE AVAILABLE]

4. 4,818,394, Apr. 4, 1989, **Separating** **agent**; Yoshio Okamoto, et al., 210/198.2, 502.1, 635, 656; 502/404; **536/63**, **64** [IMAGE AVAILABLE]

5. 4,056,672, Nov. 1, 1977, Polymer prepared by cyanhydrin method; Alf-Goran Dahlberg, et al., 424/78.17; 525/523; 527/300; **536/120**, **126**; 568/852 [IMAGE AVAILABLE]

6. 3,928,581, Dec. 23, 1975, Certain polymer-iron complexes for treatment of iron deficiency; Alf-Goran Dahlberg, et al., 514/53; 424/78.17; 514/61, 738; **536/112**, **121** [IMAGE AVAILABLE]

=> d kwic 1-6

US PAT NO: 5,543,162 [IMAGE AVAILABLE]
US-CL-CURRENT: 426/89; 127/37; 426/48, 658, 801; **536/56**, **84**

L16: 1 of 6

SUMMARY:

BSUM(16)

The . . . to remove residual ionic polymer; if desired, hardening and strengthening the encapsulated material by cross-linking the capsules with a cross-linking **agent**; **separating** the capsules from the remaining liquid, and, finally, drying them and comminuting them if aggregated. The adjustment or change in. . .

DETDESC:

DETD(27)

The . . . to remove residual ionic polymer; if desired, hardening and strengthening the encapsulated material by cross-linking the capsules with a cross-linking **agent**; **separating** the capsules from the remaining liquid, and, finally, drying them and comminuting them, if aggregated.

DETDESC:

DETD(58)

The . . . nkat) and 0.048 g of Cellulase CP (having a total endo-1, 4 beta-glucanase activity of 1350 nkat). The viscosities and **molecular** **weight** **distributions** of the hydrolyzates produced by either cellulase were similar to the hydrolyzate produced with enzymes derived from Trichoderma reesei.

DETDESC:

DETD(98)

The . . . values of the chain stiffness parameter for higher molecular weight CMC. This may be due to the differences in the **molecular** **weight** **distributions**.

US PAT NO: RE 34,457 [IMAGE AVAILABLE] L16: 2 of 6
TITLE: **Separating** **agent**
US-CL-CURRENT: 210/198.2, 502.1, 635, 656; 502/404; **536/63**, **64**

SUMMARY:

BSUM(1)

The invention relates to use of a cellulose derivative having a group containing an aromatic group as a **separating** **agent** for a chemical substance. The invention method applies to separation of optical isomers, geometrical isomers and polymers having different molecular. . .

SUMMARY:

BSUM(5)

The . . . which comprises the step of treating said mixture with a cellulose derivative having a group containing an aromatic ring, a

separating **agent** comprising the cellulose derivative; particles of the **separating** **agent**; a packing material of the particles; and a chromatographic column filled with the agent.

SUMMARY:

BSUM(18)

In using the **separating** **agent** of the present invention in the liquid or gas chromatography, there may be employed a method wherein the aromatic ring-containing . . .

SUMMARY:

BSUM(19)

Since the chromatographic **separating** **agent** is preferably in the form of granules, the aromatic ring-containing cellulose derivative to be used as the resolving agent is. . .

SUMMARY:

BSUM(22)

Both . . . oxide, glass silicate or kaolin. They may be treated on the surface so as to improve the affinity with the **separating** **agent** of the invention. The surface-treatment may be conducted with use of an organosilane compound or by plasma polymerization.

SUMMARY:

BSUM(27)

The . . . and one having the molecular asymmetry such that either one of the optical isomers may be preferably adsorbed on the **separating** **agent** of the invention.

DETDESC:

DETD(28)

140 . . . cellulose triacetate produced by an ordinary homogeneous acetylation process (number-average degree of polymerization as determined by vapor pressure osmometry: 110; **molecular** **weight** **distribution** $M_w/M_n=2.45$, free hydroxyl group content: 0.35%) was swollen in 1.4 l of acetic acid (a guaranteed reagent of Kanto Kagaku. . .

CLAIMS:

CLMS(1)

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A **separating** **agent** which comprises a cellulose derivative selected from the group consisting of cellulose tribenzoate and cellulose tribenzoate ring-substituted with alkyl, alkenyl, . . .

CLAIMS:

CLMS (2)

2. A **separating** **agent** as claimed in claim 1 in which said cellulose derivative is cellulose tribenzoate.

CLAIMS:

CLMS (3)

3. A **separating** **agent** as claimed in claim 1, wherein the amount of said cellulose derivative supported on said carrier is from 1-100 wt..

CLAIMS:

CLMS (4)

4. A **separating** **agent** as claimed in claim 1, wherein the ratio of pore size to particle size of said carrier is not larger. . . .

CLAIMS:

CLMS (5)

5. A **separating** **agent** as claimed in claim 1, wherein said carrier is an inorganic substance selected from the group consisting of silica, alumina,

CLAIMS:

CLMS (6)

6. A **separating** **agent** as claimed in claim 1, wherein said carrier is an organic substance selected from the group consisting of polystyrene, polyacrylamide. . . .

CLAIMS:

CLMS (7)

7. A **separating** **agent** as claimed in claim 1 in which said cellulose derivative is coated on said carrier and has been prepared by. . . .

CLAIMS:

CLMS (8)

8. A **separating** **agent** as claimed in claim 1, in which said carrier is an inorganic substance.

CLAIMS:

CLMS (9)

9. A **separating** **agent** as claimed in claim 8, in which said inorganic substance is silica gel.

CLAIMS:

CLMS (10)

10. A chromatographic isomer **separating** **agent** comprising a derivative of cellulose selected from the group consisting of cellulose tribenzoate and cellulose tribenzoate ring-substituted with alkyl, alkenyl, . . .

CLAIMS:

CLMS (11)

11. A chromatographic isomer **separating** **agent** as claimed in claim 10 in which said cellulose derivative is cellulose tribenzoate.

CLAIMS:

CLMS (12)

12. A chromatographic isomer **separating** **agent** as claimed in claim 10 in which said cellulose derivative is cellulose tris(3-chlorobenzoate).

CLAIMS:

CLMS (13)

13. A chromatographic isomer **separating** **agent** as claimed in claim 10 in which said cellulose derivative is cellulose tris(3,5-dichlorobenzoate).

CLAIMS:

CLMS (14)

14. A chromatographic isomer **separating** **agent** as claimed in claim 10 in which said cellulose derivative is cellulose tris(4-chlorobenzoate).

CLAIMS:

CLMS (15)

15. A chromatographic isomer **separating** **agent** as claimed in claim 10, wherein said cellulose derivative is immobilized on solid carrier particles, wherein said carrier particles are. . .

CLAIMS:

CLMS (16)

16. A chromatographic isomer **separating** **agent** as claimed in claim 15 wherein said carrier particles are porous and have pore diameters of from 10 .ANG.-100 .mu.m.

CLAIMS:

CLMS (17)

17. A chromatographic isomer **separating** **agent** as claimed in claim 16, wherein said carrier particles have an approximate pore size to particle size ratio of no. . . .

CLAIMS:

CLMS (18)

18. A chromatographic isomer **separating** **agent** as claimed in claim 15, wherein said carrier is an inorganic substance selected from among silica, alumina, magnesia, titanium oxide,. . . .

CLAIMS:

CLMS (19)

19. A chromatographic isomer **separating** **agent** as claimed in claim 15, wherein said carrier is silica gel.

CLAIMS:

CLMS (20)

20. A chromatographic isomer **separating** **agent** as claimed in claim 15, wherein said carrier is an organic substance selected from the group consisting of polystyrene, polyacrylamide. . . .

CLAIMS:

CLMS (21)

21. . . . chemical substance from a mixture containing the same, the improvement comprising said column containing a carrier having supported thereon a **separating** **agent** selected from the group consisting of cellulose tribenzoate and cellulose tribenzoate ring-substituted with alkyl, alkenyl, alkynyl, nitro, halogen, amino, alkyl-substituted. . . . size of about from 1 .mu.m to about 10 mm.. Iaddend.

.Iadd. . . The column of claim 21, wherein said **separating** **agent** is cellulose tribenzoate..Iaddend. .Iadd.25. The column of claim 21, wherein said **separating** **agent** is cellulose tribenzoate ring substituted with a group selected from among an alkyl group, an alkenyl group, an alkynyl group, . . . in the separation of a chemical substance from a mixture containing the same, the improvement comprising said column containing a **separating** **agent** in the form of beads and selected from the group consisting of cellulose tribenzoate and cellulose tribenzoate ring-substituted with alkyl, alkenyl, alkynyl, nitro, halogen, amino, alkyl-substituted amino, cyano, hydroxy, alkoxy, acyl, thiol, sulfonyl, carboxyl or alkoxy carbonyl, said **separating** **agent** having a degree of polymerization of from 5 to 5000..Iaddend. .Iadd.27. The column of claim 26, wherein said **separating** **agent** is supported on a carrier..Iaddend. .Iadd.28. The column of claim 26, wherein said **separating** **agent** has a particle size of about from 1

.mu.m to about 10 mm..Iadd. .Iadd.29. The column of claim 26, wherein said **separating** **agent** is cellulose tribenzoate..Iadd.
.Iadd.30. The column of claim 26, wherein said **separating** **agent** is cellulose tribenzoate ring substituted with a group selected from among an alkyl group, an alkenyl group, an alkynyl group, . . .

US PAT NO: 5,136,032 [IMAGE AVAILABLE] L16: 3 of 6
TITLE: Method for separating phosphopolyol compounds using a
 separating **agent**
US-CL-CURRENT: **536/18.7**; 210/500.37, 500.38, 651, 654; **536/4.1**,
 123

SUMMARY:

BSUM(12)

It . . . be attained through membrane filtration, which renders membranes unsuitable for use in the removal of a substance having a broad **molecular** **weight** **distribution**, such as a pyrogen.

SUMMARY:

BSUM(21)

It is an object of the present invention to provide an adsorption **separating** **agent** having a high safety which is excellent in its ability to remove phosphopolyol compounds such as pyrogens from a solution. . .

SUMMARY:

BSUM(27)

In the methods of the invention, the adsorbent or **separating** **agent** may be in the form of a microfiltration membrane or an ultrafiltration membrane. Alternatively, the adsorbent may be in the. . .

SUMMARY:

BSUM(28)

The invention further provides a **separating** **agent** comprising a base material and a functional chain group having a chain length of 2 to 50, bonded to the. . .

SUMMARY:

BSUM(29)

The **separating** **agent** may be in the form of a microfiltration membrane or an ultrafiltration membrane or in the form of hard gel. . .

SUMMARY:

BSUM(32)

In a preferable embodiment of the **separating** **agent**, the base

material is a polysaccharide or a polyvinyl alcohol polymer and has as an intermediate group of the functional. . .

SUMMARY:

BSUM(35)

In a different preferable embodiment of the **separating** **agent**, the base material is a porous polysaccharide and the functional group has the following formula:

SUMMARY:

BSUM(45)

Furthermore, the present invention provides a **separating** **agent** for adsorbing a phosphopolyol compound in the form of a porous adsorption **separating** **agent** comprising a base material and a functional chain bonded thereto and having a pore size of from 1 nm to. . .

SUMMARY:

BSUM(47)

The **separating** **agent** comprises a porous base material and an aliphatic amine group having a chain length of 2 to 50, bonded to. . .

SUMMARY:

BSUM(49)

A . . . drug having an acidic group such as a protein and the drug can be recovered at a high yield. The **separating** **agent** of the present invention can exert its selective adsorption effect over a wide range of pH values. For example, it. . .

SUMMARY:

BSUM(51)

The **separating** **agent** of the present invention is usually employed as an adsorption/retention **separating** **agent** and differs from chromatographic techniques used in some of the cited references of the prior arts.

SUMMARY:

BSUM(55)

The **separating** **agent** comprises a body composed of a porous base material and a functional group of an aliphatic amine group having a. . .

SUMMARY:

BSUM(56)

Beads of the gel of the **separating** **agent** are preferred to have

an average size of 2 to 200 microns. For such gel beads, porous polysaccharide having a . . .

SUMMARY:

BSUM(113)

TYPICAL **SEPARATING** **AGENT**

SUMMARY:

BSUM(114)

A typical **separating** **agent** comprises cellulose as a base material and an aliphatic chain of the above-mentioned --CH_{sub.2} CH(OH)CH_{sub.2} NHR-- type. A **separating** **agent** wherein R is H may be obtained by condensing epichlorohydrin with the base material and opening the ring with ammonia. A **separating** **agent** shown as the B-1 type in the Examples is of this type having cellulose as the base material. It is. . .

SUMMARY:

BSUM(115)

Separating **agents** of the given types (other than those wherein R is H) may be obtained by reacting these **separating** **agents** of the B-1 type or intermediate products obtained during the preparation thereof with various compounds given in the brackets in the above description. A **separating** **agent** shown as the A-1 type is a cellulose derivative having an aliphatic chain CH_{sub.2} CH(OH)CH_{sub.2} NH(CH_{sub.2}).sub.6 NH_{sub.2} which is obtained by the ring-opening reaction of a cellulose/epichlorohydrin condensate with hexamethylenediamine. The **separating** **agent** of the A-1 type may be reacted with lysine, O-methylisourea or arginine to thereby give the A-2, A-3 or A-4 type, respectively. Further, the **separating** **agent** of the B-1 type may be reacted with lysine, O-methylisourea or arginine to thereby give the B-2, B3 or B-4. . .

SUMMARY:

BSUM(116)

Furthermore, **separating** **agents** wherein agarose is used as the base material instead of cellulose may be used. However, these **separating** **agents** are in the form of a soft gel which is unsuitable for the application at a high flow rate.

SUMMARY:

BSUM(117)

Examples of the **separating** **agent** comprising a synthetic resin as the base material are as follows.

SUMMARY:

BSUM(119)

The . . . chloromethylated at the p-position and reacted with triethylamine. The reaction product is further reacted with hexamethylenediamine to thereby give a **separating** **agent** wherein a functional chain CH_{sub.2} NH(CH_{sub.2}).sub.6 NH_{sub.2} is bonded to a base material of a polystyrene resin.

SUMMARY:

BSUM(121)

In the production process of the above-mentioned **separating** **agent** of A-1 type, Epoxy Toyo Pearl 650M (a product of Toyo Soda Mfg. Co., Ltd.) is used as a base. . . .

SUMMARY:

BSUM(123)

A PVA **separating** **agent** in the form of a membrane is shown in Example 3. The **separating** **agent** may be in the form of a bead.

SUMMARY:

BSUM(129)

A . . . example, HSA). Although both a pyrogen and a drug are negatively charged, the binding force of the pyrogen to a **separating** **agent** is stronger, which enables selective adsorption. In order to achieve the selective adsorption, it is preferable to control the ionic.

SUMMARY:

BSUM(138)

The . . . treated widely varies from case to case. Said concentration may preferably several tens of .mu.g/ml or below. In particular, the **separating** **agent** of the present invention can adsorb and remove a pyrogen in a trace amount (i.e., 100 ng/ml or below). When. . . . it is sometimes effective to perform a pretreatment with the use of, for example, an UF membrane before using the **separating** **agent** of the present invention.

SUMMARY:

BSUM(139)

When the base material is in the form of a gel, the treatment with the use of the **separating** **agent** of the present invention may be effected either by a batch-type method or a column-type one.

SUMMARY:

BSUM(143)

The **separating** **agent** of the invention can be reclaimed and

reproduced from the used one having adsorbed pyrogens under the alkaline condition. Moreover. . .

SUMMARY:

BSUM(144)

The . . . a phosphopolyol compound can be effectively removed from a solution of a high ionic strength with the use of a **separating** **agent** having a specific structure. This method is excellent in percentage removal, ultimate concentration, percentage drug recovery, etc., and highly safe. Some of the **separating** **agents** to be used in this method have been known per se as a substance or suggested as an intermediate in a synthesis pathway. Some of the **separating** **agents** are furthermore known as a **separating** **agent** available for different purposes, for example, as a carrier in analytical chromatography. However, some typical **separating** **agents** have not been known hitherto as a **separating** **agent**. Accordingly, the present invention further provides a novel **separating** **agent**.

SUMMARY:

BSUM(145)

The use of the **separating** **agent** of the present invention makes it possible to remove a pyrogen from a solution of a relatively high ionic strength. . . an efficiency of as high as 99% by a single batchwise treatment. That is to say, the treatment with said **separating** **agent** can reduce the pyrogen concentrations in a solution of 100 ng/ml and 1 ng/ml, respectively, to 1 ng/ml and 10. . .

SUMMARY:

BSUM(146)

In addition, the **separating** **agent** of the present invention is effective over a wide pH range as compared with conventional pyrogen adsorbents. The applicable pH. . .

SUMMARY:

BSUM(147)

The mechanism of the function of the **separating** **agent** of the present invention has not been clarified in detail as yet. However the present inventors assume the mechanism functions. . .

SUMMARY:

BSUM(148)

Namely, the **separating** **agent**, which comprises a base material and a functional aliphatic chain, comes in close contact with a liquid passing through its pores and thus selectively adsorbs and retains a pyrogen. The base material consists of macromolecules and thus the **separating** **agent** remains insoluble as a whole. However, the base material is porous and, further, the aliphatic chain has some degree of freedom in steric structure. Namely, the **separating** **agent** has a

structure suitable for accepting large molecules (such as pyrogens or nucleic acids) and exerting the adsorption effect by. . .

SUMMARY:

BSUM(149)

The . . . to a solution of a high ionic strength, it exerts a particularly excellent effect as compared with a conventional pyrogen **separating** **agent** comprising a nitrogen-containing cyclic compound as a functional chain. Since the functional chain of the present invention carries 3 or. . .

SUMMARY:

BSUM(150)

In . . . having a short chain length and a relatively simple structure is to be bonded to the base material. Therefore, a **separating** **agent** of the desired adsorption performance may be obtained by varying the structure of the nitrogen-containing aliphatic chain structure depending on. . .

SUMMARY:

BSUM(151)

The **separating** **agent** of the present invention having the above-mentioned construction can be used in, for example, the batch-treatment of a human serum. . .

DETDESC:

DETD(4)

Separating **Agent** A-1 type:

DETDESC:

DETD(10)

This **separating** **agent** had a CH₂CH(OH)CH₂NH(CH₂)₆NH₂ chain (chain length: 11) as the major functional chain.

DETDESC:

DETD(11)

Similarly, a **separating** **agent** having a hexamethylenediamine content of 50 to 600 may be obtained by varying the reaction conditions. Some of the **separating** **agents** thus obtained by varying the reaction conditions may carry both of a CH₂CH(OH)CH₂NH(CH₂)₆NHCH₂CG(OH)CH₂ chain (chain length: . . .

DETDESC:

DETD(13)

Obtained by condensing a **separating** **agent** of the above A-1 type with lysine.

DETDESC:

DETD(16)

Obtained by condensing a **separating** **agent** of the above A-1 type with O-methylisourea to thereby give a guanidine terminal.

DETDESC:

DETD(23)

Obtained by condensing a **separating** **agent** of the above B-1 type with lysine.

DETDESC:

DETD(26)

Obtained by condensing a **separating** **agent** of the above B-1 type with O-methylisourea.

DETDESC:

DETD(43)

Test method: 1 ml of each test solution and 100 mg (wet) of a **separating** **agent** were stirred in a pyrogen-free glass test tube at room temperature at 50 rpm for 1 hour. Next, the concentration. . .

DETDESC:

DETD(44)

Results: Table 1 summarizes the results of the treatment of the test solutions with the use of various **separating** **agents**. The separation method of the present invention shows an excellent pyrogen removal performance in a higher ionic strength region.

DETDESC:

DETD(50)

By using 0.1 g (wet) of a **separating** **agent** of A-1 type, the performance of removing natural pyrogens contained in 2 ml of an aqueous drug solution was examined. . .

DETDESC:

DETD(75)

To 1-ml portions of saline solutions containing 100 ng/ml of a pyrogen at various concentrations were added 0.1-g portions of a **separating** **agent** of A-1 type. After stirring at 25.degree. C. for 1 hour at 25 rpm, the adsorption ratio for each **separating** **agent** was

determined from the pyrogen concentration of the supernatant. The relationship between the ionic strength and pyrogen adsorption ratio was as follows. Thus, it was confirmed that the **separating** **agent** gave high adsorption ratios over a wide range of ionic strength.

DETDESC:

DETD(79)

When a **separating** **agent** comprising a nitrogen-containing cyclic compound as a ligand was employed, the adsorption ratio showed a decrease at a lower ionic. . .

DETDESC:

DETD(82)

Aqueous . . . in the same manner as the one described in Example 8. The employed pyrogen, the concentration thereof and the employed **separating** **agent** were the same as those described in Example 8. The relationship between the pyrogen adsorption ratio and pH value was. . .

DETDESC:

DETD(85)

When a **separating** **agent** comprising a nitrogen-containing cyclic compound as a ligand was employed, the adsorption ratio showed a decrease at a lower pH. . .

DETDESC:

DETD(89)

After being treated with a **separating** **agent** of A-1 type, the pyrogen concentration was reduced to 1.5 pg/ml. After being treated with a **separating** **agent** of B-1 type, it was reduced to 185 pg/ml. Thus, it seems that the **separating** **agent** of A-1 type is superior to the one of B-1 type in the adsorption rate.

CLAIMS:

CLMS(7)

7. A **separating** **agent** comprising a base material and a functional chain group having a chain length of 2 to 50 bonded to the . . . base material through an ether bond, the functional chain group being an aliphatic primary or secondary amine group and said **separating** **agent** having a pore size of 1 nm to 20 microns.

CLAIMS:

CLMS(8)

8. The **separating** **agent** as claimed in claim 7, in which the functional chain group has a diaminoalkylene moiety of 1 to 12 carbon. . .

CLAIMS:

CLMS (9)

9. The **separating** **agent** as claimed in claim 7, in which the base material is a polysaccharide or a polyvinyl alcohol polymer and has:

CLAIMS:

CLMS (10)

10. The **separating** **agent** as claimed in claim 7, in which the functional chain group includes an amino acid residue bonded to the diaminoalkylene.

CLAIMS:

CLMS (11)

11. The **separating** **agent** as claimed in claim 7, in which the base material is selected from the group consisting of a polysaccharide and:

CLAIMS:

CLMS (12)

12. The **separating** **agent** as claimed in claim 11, in which the functional group has a chain length of 3 to 35 and includes:

CLAIMS:

CLMS (13)

13. The **separating** **agent** as claimed in claim 7, in which the base material is a porous polysaccharide and the functional group has the:

CLAIMS:

CLMS (14)

14. The **separating** **agent** as claimed in claim 7, in which the base material is a porous cellulose and the functional group has the:

CLAIMS:

CLMS (15)

15. The **separating** **agent** as claimed in claim 7, in which the base material is a porous cellulose and the functional group has the:

CLAIMS:

CLMS(16)

16. The **separating** **agent** as claimed in claim 7, in which the base material is a porous polysaccharide and the functional group has the.

CLAIMS:

CLMS(18)

18. A **separating** **agent** comprising a polyhydroxyl polymer base material with a pore size of 50 nm to 1 micron having a functional chain.

US PAT NO: 4,818,394 [IMAGE AVAILABLE]

L16: 4 of 6

TITLE: **Separating** **agent**

US-CL-CURRENT: 210/198.2, 502.1, 635, 656; 502/404; **536/63**, **64**

SUMMARY:

BSUM(1)

The invention relates to use of a cellulose derivative having a group containing an aromatic group as a **separating** **agent** for a chemical substance. The invention method applies to separation of optical isomers, geometrical isomers and polymers having different molecular.

SUMMARY:

B SUM(5)

The . . . which comprises the step of treating said mixture with a cellulose derivative having a group containing an aromatic ring, a **separating** **agent** comprising the cellulose derivative; particles of the **separating** **agent**; a packing material of the particles; and a chromatographic column filled with the agent.

SUMMARY:

B SUM(18)

In using the **separating** **agent** of the present invention in the liquid or gas chromatography, there may be employed a method wherein the aromatic ring-containing.

SUMMARY:

B SUM(19)

Since the chromatographic **separating** **agent** is preferably in the form of granules, the aromatic ring-containing cellulose derivative to be used as the resolving agent is.

SUMMARY:

B SUM(22)

Both . . . oxide, glass, silicate or kaolin. They may be treated on

the surface so as to improve the affinity with the **separating** **agent** of the invention. The surface-treatment may be conducted with use of an organosilane compound or by plasma polymerization.

SUMMARY:

BSUM(27)

The . . . and one having the molecular asymmetry such that either one of the optical isomers may be preferably adsorbed on the **separating** **agent** of the invention.

DETDESC:

DETD(28)

140 . . . cellulose triacetate produced by an ordinary homogeneous acetylation process (number-average degree of polymerization as determined by vapor pressure osmometry: 110; **molecular** **weight** **distribution** $M_w/M_n=2.45$, free hydroxyl group content: 0.35%) was swollen in 1.4 l of acetic acid (a guaranteed reagent of Kanto Kagaku).

CLAIMS:

CLMS(1)

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A **separating** **agent** which comprises a cellulose derivative selected from the group consisting of cellulose tribenzoate and cellulose tribenzoate ring-substituted with alkyl, alkenyl, . . .

CLAIMS:

CLMS(2)

2. A **separating** **agent** as claimed in claim 1 in which said cellulose derivative is cellulose tribenzoate.

CLAIMS:

CLMS(3)

3. A **separating** **agent** as claimed in claim 1, wherein the amount of said cellulose derivative supported on said carrier is from 1-100 wt.% . . .

CLAIMS:

CLMS(4)

4. A **separating** **agent** as claimed in claim 1, wherein the ratio of pore size to particle size of said carrier is not larger. . .

CLAIMS:

CLMS(5)

5. A **separating** **agent** as claimed in claim 1, wherein said carrier is an inorganic substance selected from the group consisting of silica, alumina, . . .

CLAIMS:

CLMS(6)

6. A **separating** **agent** as claimed in claim 1, wherein said carrier is an organic substance selected from the group consisting of polystyrene, polyacrylamide. . .

CLAIMS:

CLMS(7)

7. A **separating** **agent** as claimed in claim 1 in which said cellulose derivative is coated on said carrier and has been prepared by.

CLAIMS:

CLMS(8)

8. A **separating** **agent** as claimed in claim 5, in which said carrier is an inorganic substance.

CLAIMS:

CLMS(9)

9. A **separating** **agent** as claimed in claim 8, in which said inorganic substance is silica gel.

CLAIMS:

CLMS(10)

10. A chromatographic isomer **separating** **agent** comprising a derivative of cellulose selected from the group consisting of cellulose tribenzoate and cellulose tribenzoate ring-substituted with alkyl, alkenyl, . . .

CLAIMS:

CLMS(11)

11. A chromatographic isomer **separating** **agent** as claimed in claim 10 in which said cellulose derivative is cellulose tribenzoate.

CLAIMS:

CLMS(12)

12. A chromatographic isomer **separating** **agent** as claimed in claim 8 in which said cellulose derivative is cellulose tris(3-chlorobenzoate).

CLAIMS:

CLMS(13)

13. A chromatographic isomer **separating** **agent** as claimed in claim 8 in which said cellulose derivative is cellulose tris(3,5-dichlorobenzoate).

CLAIMS:

CLMS(14)

14. A chromatographic isomer **separating** **agent** as claimed in claim 8 in which said cellulose derivative is cellulose tris(4-chlorobenzoate).

CLAIMS:

CLMS(15)

15. A chromatographic isomer **separating** **agent** as claimed in claim 8, wherein said cellulose derivative is immobilized on solid carrier particles, wherein said carrier particles from.

CLAIMS:

CLMS(16)

16. A chromatographic isomer **separating** **agent** as claimed in claim 15 wherein said carrier particles are porous and have pore diameters of from 10 .ANG.-100 .mu.m.

CLAIMS:

CLMS(17)

17. A chromatographic isomer **separating** **agent** as claimed in claim 16, wherein said carrier particles have an approximate pore size to particle size ratio of no.

CLAIMS:

CLMS(18)

18. A chromatographic isomer **separating** **agent** as claimed in claim 15, wherein said carrier is an inorganic substance selected from among silica, alumina, magnesia, titanium oxide,.

CLAIMS:

CLMS(19)

19. A chromatographic isomer **separating** **agent** as claimed in claim 15, wherein said carrier is silica gel.

CLAIMS:

CLMS(20)

20. A chromatographic isomer **separating** **agent** as claimed in claim 15, wherein said carrier is an organic substance selected from the group consisting of polystyrene, polyacrylamide. . . .

US PAT NO: 4,056,672 [IMAGE AVAILABLE]

L16: 5 of 6

US-CL-CURRENT: 424/78.17; 525/523; 527/300; **536/120**, **126**; 568/852

SUMMARY:

BSUM(41)

It may be advantageous to carry out the polymerization by adding the alkali and the polymerizing **agent** **separately** to an alkaline aqueous solution of the saccharide and the polyhydric alcohol. However, the alkali and polymerizing agent may also. . . .

SUMMARY:

BSUM(52)

In . . . molecular weights is obtained. It is not possible to ascribe a precise, unitary chemical structure to the reaction product. The **molecular** **weight** **distribution** of the immediate reaction product obtained after the polymerization process is completed may as indicated above, be changed, by removing. . . .

SUMMARY:

BSUM(63)

The **molecular** **weight** **distribution** of the final product is estimated by gel filtration on Sephadex.RTM. G:15, G:25 or G:50. A sample consisting of an. . . is corrected against a blank and plotted against the volume of eluate. The diagram obtained is a measure of the **molecular** **weight** **distribution**. The eluate is also tested for contents of Cl.sup.-. This gel filtration test is well known in the art as. . . .

US PAT NO: 3,928,581 [IMAGE AVAILABLE]

L16: 6 of 6

US-CL-CURRENT: 514/53; 424/78.17; 514/61, 738; **536/112**, **121**

SUMMARY:

BSUM(41)

It may be advantageous to carry out the polymerization by adding the alkali and the polymerizing **agent** **separately** to an alkaline aqueous solution of the saccharide and the polyhydric alcohol. However, the alkali and polymerizing agent may also. . . .

SUMMARY:

BSUM(52)

In . . . molecular weights is obtained. It is not possible to ascribe a precise, unitary chemical structure to the reaction products. The

molecular **weight** **distribution** of the immediate reaction product obtained after the polymerization process is completed may as indicated above, be changed, by removing. . .

SUMMARY:

BSUM(64)

The **molecular** **weight** **distribution** of the final product is estimated by gel filtration on Sephadex G:15, G:25 or G:50. A sample consisting of an. . . is corrected against a blank and plotted against the volume of eluate. The diagram obtained is a measure of the **molecular** **weight** **distribution**. The eluate is also tested for contents of Cl.sup.-. This gel filtration test is well known in the art as. . .

=> d his

(FILE 'USPAT' ENTERED AT 15:21:58 ON 04 OCT 96)

L1 7700 S MOLECULAR(W) WEIGHT? (W) DISTRIBUTION?
L2 22 S L1 AND 210/198.2/CCLST
L3 1 S 5354852/PN
L4 0 S L1 AND L3
L5 28 S L1 AND 210/656-659/CCLST
L6 28 S L5 NOT L3
L7 12 S L5 NOT L2
L8 20 S L1 AND 210/635/CCLST
L9 15 S L8 NOT L7
L10 4 S L9 NOT L2
L11 88 S L1 AND 536/CLAS
L12 69 S L11 AND CHROMATOGRAD?
L13 904350 S SUPPORT?
L14 20 S L11 AND L13
L15 1682 S SEPARAT? (A) AGENT?
L16 6 S L11 AND L15

=>

=> s amylose(5a)dimethylphenyl?

2689 AMYLOSE

9786 DIMETHYLPHENYL?

L1 16 AMYLOSE(5A)DIMETHYLPHENYL?

=> d 1-16

1. 5,605,819, Feb. 25, 1997, Quantitative conversion of indene to (1S,2R) indene oxide and (1S,2R)-indandiol by combination of haloperoxidase bioconversion and chemical steps; Michel M. Chartrain, et al., 435/123, 156, 166, 171, 192, 280, 911 [IMAGE AVAILABLE]

2. 5,514,818, May 7, 1996, Resolution of stereoisomers of aliphatic epoxides; Kozo Tachibana, 549/541, 542, 555, 557, 561, 563 [IMAGE AVAILABLE]

3. 5,496,937, Mar. 5, 1996, Polysaccharide substances, process for producing them and use of them; Yoshio Okamoto, et al., 536/124, 210/198.2, 635, 636; 502/401, 402; 536/1.11, 4.1, 18.7, 22.1, 115 [IMAGE AVAILABLE]

4. 5,489,387, Feb. 6, 1996, Separation agent comprising acyl- or carbamoyl-substituted polysaccharide; Hajime Namikoshi, et al., 210/635, 198.2, 502.1, 656; 502/404 [IMAGE AVAILABLE]

5. 5,415,780, May 16, 1995, Separation agent comprising acyl- or carbamoyl-substituted polysaccharide; Hajime Namikoshi, et al., 210/635, 198.2, 502.1, 656; 502/404 [IMAGE AVAILABLE]

6. 5,368,737, Nov. 29, 1994, Separation agent comprising acyl- or carbamoyl-substituted polysaccharide; Hajime Namikoshi, et al., 210/635, 198.2, 502.1, 656; 502/404 [IMAGE AVAILABLE]

7. 5,229,002, Jul. 20, 1993, Separation agent comprising acyl- or carbamoyl-substituted polysaccharide; Hajime Nakikoshi, et al., 210/635, 198.2, 502.1, 656; 502/404 [IMAGE AVAILABLE]

8. 5,202,433, Apr. 13, 1993, Polysaccharide derivatives as separating agents; Yoshio Okamoto, et al., 540/200, 357, 362; 544/246; 549/401, 512; 568/336, 730, 808 [IMAGE AVAILABLE]

9. 5,162,576, Nov. 10, 1992, Resolution of ketoprofen; Thanikavelu Manimaran, et al., 562/401; 546/136; 560/52; 562/460 [IMAGE AVAILABLE]

10. 5,137,638, Aug. 11, 1992, Separation agent comprising acyl- or carbamoyl-substituted polysaccharide; Hajime Namikoshi, et al., 210/635, 198.2, 502.1, 656; 502/404 [IMAGE AVAILABLE]

11. 5,075,009, Dec. 24, 1991, Separation agent comprising acyl- or carbamoyl-substituted polysaccharide; Hajime Namikoshi, et al., 210/635, 198.2, 502.1, 656; 502/404 [IMAGE AVAILABLE]

12. 5,017,290, May 21, 1991, Separation agent comprising acyl- or carbamoyl-substituted polysaccharide; Hajime Namikoshi, et al., 210/635, 198.2, 502.1, 656; 502/404 [IMAGE AVAILABLE]

13. 4,966,694, Oct. 30, 1990, Separation agent comprising acyl- or carbamoyl-substituted polysaccharide; Hajime Namikoshi, et al., 210/198.2, 502.1; 502/404 [IMAGE AVAILABLE]

14. 4,912,205, Mar. 27, 1990, Alkyl-substituted phenylcarbamate derivative of polysaccharide; Yoshio Okamoto, et al., 536/20; 210/656; 536/18.7 [IMAGE AVAILABLE]

15. 4,879,038, Nov. 7, 1989, Separation agent comprising acyl- or carbamoyl-substituted polysaccharide; Hajime Namikoshi, et al., 210/635, 198.2, 502.1, 656; 502/404 [IMAGE AVAILABLE]

16. 4,861,872, Aug. 29, 1989, Alkyl-phenylcarbamate derivative of polysaccharide; Yoshio Okamoto, et al., 536/18.7; 106/162.1, 162.2, 163.01, 167.01, 207.1; 210/656; 536/20, 30, 45, 51 [IMAGE AVAILABLE]
=> d kwic 1-16

US PAT NO: 5,605,819 [IMAGE AVAILABLE]

L1: 1 of 16

DETDESC:

DETD(19)

Samples . . . HPLC was used to detect indene and bromo-indanols. The system consisted of a solvent delivery pump, an autosampler, a column (**amylose** tris (3,5-**dimethylphenyl** carbamated) coated on a 10 .mu.m silica gel substrate, 4.6.times.25) and a UV detector set at 220 nm. The mobile. . .

DETDESC:

DETD(21)

Assay for the chiral diol follows. The (1S,2R) and (1R,2S) indandiols were separated, employing a column (**amylose** tris (3,5-**dimethylphenyl** carbamate) coated on a 10 .mu.m silica-gel substrate). The mobile phase (92% hexane, 8% ethanol) was delivered at a rate. . .

US PAT NO: 5,514,818 [IMAGE AVAILABLE]

L1: 2 of 16

DETDESC:

DETD(21)

The . . . also packed with fillers which comprised silica gel treated with aminopropylsilane followed by 3,5-dimethylphenyl isocyanate and 20 weight % of **amylose** tris(3,5-**dimethylphenylcarbamate**) (CHIRALPAK.RTM.AD) or **amylose** tris((S)-methylbenzylcarbamate) (CHIRALPAK.RTM.AS) supported on the silica gel of 10 .mu.m (CHIRALCEL.RTM. and CHIRALPAK.RTM. are registered trademarks of Daicel Chemical Industries,. . .

CLAIMS:

CLMS(18)

18. The method of claim 1, wherein said resolving agent is **amylose** tris (3,5-**dimethylphenylcarbamate**) supported on silica gel.

US PAT NO: 5,496,937 [IMAGE AVAILABLE]

L1: 3 of 16

DETDESC:

DETD(171)

The . . . 515 Pump, a 484 UV Detector, etc. As a control was cited a separating agent prepared by physically coating an **amylose** tris (3,5-**dimethylphenyl** carbamate) derivative onto aminopropyl functionalized silica gel. Results cited are shown in Table 2, 3 and 4 [see Chemistry Letters, . . .]

US PAT NO: 5,489,387 [IMAGE AVAILABLE]

L1: 4 of 16

DETDESC:

DETD(200)

In . . . and that obtained when hexane/2-propanol (90:10) was used are shown in parentheses. For comparison, the .alpha. values of cellulose and **amylose** tris(3,5-**dimethylphenylcarbamates**) having a high optical resolution capacity are also shown. When the racemic compound (8) and amylose tris(4-biphenylylcarbamate) were used, the . . . and cellulose tris(4-biphenylylcarbamate) were used, the .alpha. value was 1.33, which were far higher than those obtained when cellulose and **amylose** tris(3,5-**dimethylphenylcarbamate**) were used.

DETDESC:

DETD(215)

In the results of the resolution obtained with amylose tris(4-phenoxyphenylcarbamate), the racemic compounds which could not be resolved with **amylose** tris(3,5 **dimethylphenylcarbamate**) and **amylose** tris(3,5 dichlorophenylcarbamate) could be resolved with amylose tris(4-phenoxyphenylcarbamate), though the .alpha. values were low (.alpha.=1.08 and 1.16, respectively). In the . . .

US PAT NO: 5,415,780 [IMAGE AVAILABLE]

L1: 5 of 16

DETDESC:

DETD(204)

In . . . and that obtained when hexane/2-propanol (90:10) was used are shown in parentheses. For comparison, the .alpha. values of cellulose and **amylose** tris(3,5-**dimethylphenylcarbamates**) having a high optical resolution capacity are also shown. When the racemic compound (8) and amylose tris(4-biphenylylcarbamate) were used, the . . . (10) and cellulose tris(4-biphenylylcarbamate) were used, the value was 1.33, which were far higher than those obtained when cellulose and **amylose** tris(3,5-**dimethylphenylcarbamate**) were used.

DETDESC:

DETD(219)

In the results of the resolution obtained with amylose tris(4-phenoxyphenylcarbamate), the racemic compounds which could not be resolved with **amylose** tris(3,5 **dimethylphenylcarbamate**) and

amylose tris(3,5 dichlorophenylcarbamate) could be resolved with amylose tris(4-phenoxyphenylcarbamate), though the .alpha. values were low (.alpha.=1.08 and 1.16, respectively). In the. . .

US PAT NO: 5,368,737 [IMAGE AVAILABLE]

L1: 6 of 16

DETDESC:

DETD(172)

In . . . and that obtained when hexane/2-propanol (90:10) was used are shown in parentheses. For comparison, the .alpha. values of cellulose and **amylose** tris(3,5-**dimethylphenylcarbamates**) having a high optical resolution capacity are also shown. When the racemic compound (8) and amylose tris(4-biphenylylcarbamate) were used, the. . . and cellulose tris(4-biphenylylcarbamate) were used, the .alpha. value was 1.33, which were far higher than those obtained when cellulose and **amylose** tris(3,5-**dimethylphenylcarbamate**) were used.

DETDESC:

DETD(187)

In the results of the resolution obtained with amylose tris(4-phenoxyphenylcarbamate), the racemic compounds which could not be resolved with **amylose** tris(3,5 **dimethylphenylcarbamate**) and **amylose** tris(3,5dichlorophenylcarbamate) could be resolved with amylose tris(4-phenoxyphenylcarbamate), though the .alpha. values were low (.alpha.=1.08 and 1.16, respectively). In the results. . .

US PAT NO: 5,229,002 [IMAGE AVAILABLE]

L1: 7 of 16

DETDESC:

DETD(199)

In . . . and that obtained when hexane/2-propanol (90:10) was used are shown in parentheses. For comparison, the .alpha. values of cellulose and **amylose** tris(3,5-**dimethylphenylcarbamates**) having a high optical resolution capacity are also shown. When the racemic compound (8) and amylose tris(4-biphenylylcarbamate) were used, the. . . and cellulose tris(4-biphenylylcarbamate) were used, the .alpha. value was 1.33, which were far higher than those obtained when cellulose and **amylose** tris(3,5-**dimethylphenylcarbamate**) were used.

DETDESC:

DETD(214)

In the results of the resolution obtained with amylose tris(4-phenoxyphenylcarbamate), the racemic compounds which could not be resolved with **amylose** tris(3,5 **dimethylphenylcarbamate**) and **amylose** tris(3,5 dichlorophenylcarbamate) could be resolved with amylose tris(4-phenoxyphenylcarbamate), though the .alpha. values were low (.alpha.=1.08 and 1.16, respectively). In the. . .

US PAT NO: 5,202,433 [IMAGE AVAILABLE]

L1: 8 of 16

DETDESC:

DETD(147)

The . . . used in Comparative Example 1 or 2 is prepared in the same manner as that described above except that cellulose 3,5-
dimethylphenylcarbamate or **amylose** 3,5-
dimethylphenylcarbamate was used.

DETDESC:

DETD(152)

parameters

ration

Separating agent k.sub.1
 .alpha.

Rs Conditions of chromatography

Comp.
2-1
1 **amylose** 3,5-**dimethylphenylcarbamate**
 1.54
 1.00
 -- hexane/2-propanol = 8/2, flow
 rate: 0.5/min

Ex. 2-2

2a " 7.73

US PAT NO: 5,162,576 [IMAGE AVAILABLE]

L1: 9 of 16

SUMMARY:

BSUM(9)

In . . . (1989), the direct optical resolution of anti-inflammatory drugs such as ibuprofen, ketoprofen, and flurbiprofen acid was attempted by HPLC using tris(3,5-**dimethylphenylcarbamate**)s of cellulose and **amylose** as chiral stationary phases. Although ibuprofen was not sufficiently resolved, the other three 2-arylpropionic acids were completely resolved by the . . .

US PAT NO: 5,137,638 [IMAGE AVAILABLE]

L1: 10 of 16

DETDESC:

DETD(204)

In . . . and that obtained when hexane/2-propanol (90:10) was used are shown in parentheses. For comparison, the .alpha. values of cellulose and **amylose** tris(3,5-**dimethylphenylcarbamates**) having a high optical resolution capacity are also shown. When the racemic compound (8) and amylose tris(4-biphenylylcarbamate) were used, the . . . and cellulose tris(4-biphenylylcarbamate) were used, the .alpha. value was 1.33, which were far higher than those obtained when cellulose and **amylose** tris(3,5-**dimethylphenylcarbamate**) were used.

DETDESC:

DETD(220)

In the results of the resolution obtained with amylose tris(4-phenoxyphenylcarbamate), the racemic compounds which could not be resolved with **amylose** tris(3,5 **dimethylphenylcarbamate**) and **amylose** tris(3,5 dichlorophenylcarbamate) could be resolved with amylose tris(4-phenoxyphenylcarbamate), though the .alpha. values were low (.alpha.=1.08 and 1.16, respectively). In the. . .

US PAT NO: 5,075,009 [IMAGE AVAILABLE]

L1: 11 of 16

DETDESC:

DETD(189)

In . . . and that obtained when hexane/2-propanol (90:10) was used are shown in parentheses. For comparison, the .alpha. values of cellulose and **amylose** tris(3,5-**dimethylphenylcarbamates**) having a high optical resolution capacity are also shown. When the racemic compound (8) and amylose tris(4-biphenylylcarbamate) were used, the. . . and cellulose tris(4-biphenylylcarbamate) were used, the .alpha. value was 1.33, which were far higher than those obtained when cellulose and **amylose** tris(3,5-**dimethylphenylcarbamate**) were used.

DETDESC:

DETD(204)

In the results of the resolution obtained with amylose tris(4-phenoxyphenylcarbamate), the racemic compounds which could not be resolved with **amylose** tris(3,5 **dimethylphenylcarbamate**) and **amylose** tris(3,5 dichlorophenylcarbamate) could be resolved with amylose tris(4-phenoxyphenylcarbamate), though the .alpha. values were low (.alpha.=1.08 and 1.16, respectively). In the. . .

US PAT NO: 5,017,290 [IMAGE AVAILABLE]

L1: 12 of 16

DETDESC:

DETD(182)

In . . . and that obtained when hexane/2-propanol (90:10) was used are shown in parentheses. For comparison, the .alpha. values of cellulose and **amylose** tris(3,5-**dimethylphenylcarbamates**) having a high optical resolution capacity are also shown. When the racemic compound (8) and amylose tris(4-biphenylylcarbamate) were used, the. . . and cellulose tris(4-biphenylylcarbamate) were used, the .alpha. value was 1.33, which were far higher than those obtained when cellulose and **amylose** tris(3,5-**dimethylphenylcarbamate**) were used.

DETDESC:

DETD(197)

In the results of the resolution obtained with amylose

tris(4-phenoxyphenylcarbamate), the racemic compounds which could not be resolved with **amylose** tris(3,5 **dimethylphenylcarbamate**) and **amylose** tris(3,5 dichlorophenylcarbamate) could be resolved with amylose tris(4-phenoxyphenylcarbamate), though the .alpha. values were low (.alpha.=1.08 and 1.16, respectively). In the. . .

US PAT NO: 4,966,694 [IMAGE AVAILABLE]

L1: 13 of 16

DETDESC:

DETD(198)

In . . . and that obtained when hexane/2-propanol (90:10) was used are shown in parentheses. For comparison, the .alpha. values of cellulose and **amylose** tris(3,5-**dimethylphenylcarbamates**) having a high optical resolution capacity are also shown. When the racemic compound (8) and amylose tris(4-biphenylylcarbamate) were used, the. . . and cellulose tris(4-biphenylylcarbamate) were used, the .alpha. value was 1.33, which were far higher than those obtained when cellulose and **amylose** tris(3,5-**dimethylphenylcarbamate**) were used.

DETDESC:

DETD(213)

In the results of the resolution obtained with amylose tris(4-phenoxyphenylcarbamate), the racemic compounds which could not be resolved with **amylose** tris(3,5 **dimethylphenylcarbamate**) and **amylose** tris(3,5 dichlorophenylcarbamate) could be resolved with amylose tris(4-phenoxyphenylcarbamate), though the .alpha. values were low (.alpha.=1.08 and 1.16, respectively). In the. . .

US PAT NO: 4,912,205 [IMAGE AVAILABLE]

L1: 14 of 16

DETDESC:

DETD(2)

Synthesis of **Amylose** Tris(3,5-**Dimethylphenylcarbamate**)

DETDESC:

DETD(3)

1.0 . . . put into methanol to effect precipitation. The obtained precipitates were collected with a glass filter to obtain 2.465 g of **amylose** tris(3,5-**dimethylphenylcarbamate**). A yield of the intended product was 66.4 wt.%. The IR analysis of the product was:

US PAT NO: 4,879,038 [IMAGE AVAILABLE]

L1: 15 of 16

DETDESC:

DETD(183)

In . . . and that obtained when hexane/2-propanol (90:10) was used are shown in parentheses. For comparison, the c values of cellulose and **amylose** tris(3,5-**dimethylphenylcarbamates**) having a high optical

resolution capacity are also shown. When the racemic compound (8) and amylose tris(4-biphenylcarbamate) were used, the . . . and cellulose tris(4-biphenylcarbamate) were used, the .alpha. value was 1.33, which were far higher than those obtained when cellulose and **amylose** tris(3,5-**dimethylphenylcarbamate**) were used.

DETDESC:

DETD(199)

In the results of the resolution obtained with amylose tris(4-phenoxyphenylcarbamate), the racemic compounds which could not be resolved with **amylose** tris(3,5 **dimethylphenylcarbamate**) and **amylose** tris(3,5 dichlorophenylcarbamate) could be resolved with amylose tris(4-phenoxyphenylcarbamate), though the .alpha. values were low (.alpha.=1.08 and 1.16, respectively). In the. . .

US PAT NO: 4,861,872 [IMAGE AVAILABLE]

L1: 16 of 16

DETDESC:

DETD(2)

Synthesis of **amylose** tris(3,5-**dimethylphenyl**-carbamate)

DETDESC:

DETD(3)

1.0 . . . was transferred into methanol to cause precipitation, and the precipitate was collected on a glass filter. The amount of obtained **amylose** tris(3,5-**dimethylphenylcarbamate**) was 2.465 g (the yield was 66.4%).

DETDESC:

DETD(7)

Amylose tris(3,5-**dimethylphenylcarbamate**) obtained in Example 1 was supported on a silica gel (Lichrospher SI4000 supplied by E. Merk, 10 .mu.m), and the. . .
=> s molecular(w) weight? (w) distribution?

222762 MOLECULAR
721379 WEIGHT?

265033 DISTRIBUTION?

L2 8024 MOLECULAR (W) WEIGHT? (W) DISTRIBUTION?

=> s l1 and l2

L3 0 L1 AND L2

=> s mw/mn?

WARNING - FIELD CODE NOT VALID 'MN?'

L4 0 MW/MN?

=> s mw(2a)mn

30158 MW

39891 MN

L5 3338 MW(2A)MN

=> s l1 and l5

L6 O L1 AND L5
=> s amylose?
L7 2730 AMYLOSE?
=> s l5 and l7
L8 19 L5 AND L7
=> d 1-19

1. 5,578,325, Nov. 26, 1996, Nanoparticles and microparticles of non-linear hydrophilic-hydrophobic multiblock copolymers; Abraham J. Domb, et al., 424/501, 78.08, 451, 462, 489, 497, 498, 502; 428/402.21, 402.24, 403; 514/772.3, 784, 963 [IMAGE AVAILABLE]
2. 5,518,902, May 21, 1996, High pullulan content product, and its preparation and uses; Yoshihide Ozaki, et al., 435/102, 101; 536/123.12 [IMAGE AVAILABLE]
3. 5,442,096, Aug. 15, 1995, Polymerizable compound and polymer therefrom; Satoshi Urano, et al., 560/190, 76, 81, 85, 86, 88, 145, 171, 193, 196 [IMAGE AVAILABLE]
4. 5,409,973, Apr. 25, 1995, Polymer composition including destructured starch and an ethylene copolymer; Catia Bastioli, et al., 524/53, 52, 312, 377, 387 [IMAGE AVAILABLE]
5. 5,384,187, Jan. 24, 1995, Biodegradable resin compositions and laminates based thereon; Tomoyoshi Uemura, et al., 442/59; 428/461, 500, 507, 511, 514, 515, 516, 520; 442/62; 524/47, 48; 525/56 [IMAGE AVAILABLE]
6. 5,378,286, Jan. 3, 1995, Method of preparing reduced fat foods; Ruth G. Chiou, et al., 127/36, 1, 38, 40, 69, 70, 71 [IMAGE AVAILABLE]
7. 5,372,835, Dec. 13, 1994, Method of preparing reduced fat foods; Jeanette A. Little, et al., 426/573, 238, 549, 661, 804 [IMAGE AVAILABLE]
8. 5,368,840, Nov. 29, 1994, Natural polymers as contrast media for magnetic resonance imaging; Evan C. Unger, 424/9.36; 128/653.4; 424/9.35, 9.364; 436/173, 806; 514/6, 54, 56, 57, 59; 534/15 [IMAGE AVAILABLE]
9. 5,364,652, Nov. 15, 1994, Indigestable dextrin; Kazuhiro Ohkuma, et al., 426/549, 590, 658 [IMAGE AVAILABLE]
10. 5,360,830, Nov. 1, 1994, Expanded articles of biodegradable plastic materials; Catia Bastioli, et al., 521/84.1, 149, 916 [IMAGE AVAILABLE]
11. 5,334,634, Aug. 2, 1994, Polymer compositions for the production of articles of biodegradable plastics material and methods for their preparation; Catia Bastiolo, et al., 524/47, 52 [IMAGE AVAILABLE]
12. 5,288,765, Feb. 22, 1994, Expanded articles of biodegradable plastics materials and a method for their production; Catia Bastioli, et al., 521/84.1; 106/214.2, 215.2; 524/47, 52, 53 [IMAGE AVAILABLE]
13. RE 34,457, Nov. 30, 1993, Separating agent; Yoshio Okamoto, et al., 210/198.2, 502.1, 635, 656; 502/404; 536/63, 64 [IMAGE AVAILABLE]
14. 5,248,749, Sep. 28, 1993, Polymerizable compound and polymer therefrom; Urano Satoshi, et al., 526/322, 285, 286, 312, 320, 321, 323;

556/449, 560/190, 193, 201 [IMAGE AVAILABLE]

15. 5,247,013, Sep. 21, 1993, Biocompatible polyester and production thereof; Hosei Shinoda, et al., 525/54.2; 524/732; 527/300, 305 [IMAGE AVAILABLE]

16. 5,169,896, Dec. 8, 1992, Polymerizable compound and polymer therefrom; Satoshi Urano, et al., 525/57, 56; 526/280, 285; 556/449; 560/190, 193, 201 [IMAGE AVAILABLE]

17. 5,117,044, May 26, 1992, Polymerizable compound and polymer therefrom; Satoshi Urano, et al., 560/193; 526/280, 285; 556/449; 560/190, 201 [IMAGE AVAILABLE]

18. 5,070,122, Dec. 3, 1991, Environmentally degradable polymer blends; Jeffrey J. Vanderbilt, et al., 524/47, 48, 53, 54, 55 [IMAGE AVAILABLE]

19. 4,818,394, Apr. 4, 1989, Separating agent; Yoshio Okamoto, et al., 210/198.2, 502.1, 635, 656; 502/404; 536/63, 64 [IMAGE AVAILABLE]
=> d kwic 1-19

US PAT NO: 5,578,325 [IMAGE AVAILABLE]

L8: 1 of 19

DETDESC:

DETD(116)

TABLE 1

Polymer	Molecular weights of PEG block copolymers		MP
	Mn	**Mw**	
PEG-PCL block copolymers			
PCL-PEG 5k (1:5 w/w)	29,500	70,100	55-58
PCL-PEG 12k (1:5 w/w)	25,500	88,100.	. . .

DETDESC:

DETD(139)

Trimethoxy-PEG-citrate . . . anhydride derivative, which was polymerized with a sebacic anhydride prepolymer to form a multiblock copolymer with a molecular weight of **Mw**=58,000; **Mn**=31,000. MP=65.degree.-74.degree. C.

DETDESC:

DETD(158)

2-Hydroxyadipaldehyde . . . ethylene diamine to form PLA-terminated with diamino groups. This polymer is reacted with an oxidized polysaccharide, such as dextran or **amylose**, to form a PLA-di-(polysaccharide) derivative.

US PAT NO: 5,518,902 [IMAGE AVAILABLE]

L8: 2 of 19

DETDESC:

DETD(98)

Six parts by weight of a strong flour and 12 parts by weight of **amylose** as a part of a main material were added with water, and the mixture was kneaded with a mixer. The . . .

DETDESC:

DETD(119)

A . . . having an average molecular weight (Mw) of 50,000 and a ratio of the average molecular weight against the average molecular-number (**Mw**/**Mn**) ratio of 1.4 in the yield of about 45%. The pullulan thus obtained was prepared into an about 4-10 w/v. . . .

US PAT NO: 5,442,096 [IMAGE AVAILABLE]

L8: 3 of 19

SUMMARY:

BSUM(29)

Typical . . . diol, cyclooctane diol, cyclopentane diol, decalin diol, decane diol, ethylene glycol, propylene glycol, dihydroxyacetophenone, dihydroxyanthraquinone, dihydroxybenzophenone, hydroxybenzylalcohol, catechol, pentaerythritol, glycerol, **amylose**, lactose, sucrose, manitol, maltose and the like.

DETDESC:

DETD(35)

A . . . for 30 minutes. It was mixed with heating for 1.5 hours and cooled to obtain transparent and light yellow polymer (**Mn**=14,200, **Mw**=37,500, .alpha.=2.63) .

DETDESC:

DETD(37)

A . . . for 30 minutes. It was mixed with heating for 1.5 hours and cooled to obtain transparent and light yellow polymer (**Mn**=9,730, **Mw**=30,942, .alpha.=3.17) .

DETDESC:

DETD(39)

A . . . for 30 minutes. It was mixed with heating for 1.5 hours and cooled to obtain transparent and light yellow polymer (**Mn**=2,799, **Mw**=5,695, .alpha.=2.03) .

DETDESC:

DETD(41)

A . . . for 30 minutes. It was mixed with heating for 1.5 hours and

cooled to obtain transparent and light yellow polymer (**Mn**=8,050, **Mw**=17,240, .alpha.=2.14).

DETDESC:

DETD(53)

A . . . for 30 minutes. It was mixed with heating for 1.5 hours and cooled to obtain transparent and light yellow polymer (**Mn**=8,870, **Mw**=20,600, OH value=100, .alpha.=2.31).

DETDESC:

DETD(79)

A . . . degree. C. (E type viscometer at 25.degree. C.) and a nonvolatile content of 50% (130.degree. C., one hour), and had **Mn**=6,790, **Mw**=13,300, .alpha.=1.96.

DETDESC:

DETD(85)

A . . . 83 cps (E type viscometer at 25.degree. C.) and a nonvolatile content of 49% (130.degree. C., one hour), and had **Mn**=4,800, **Mw**=10,090, .alpha.=2.10.

DETDESC:

DETD(91)

A . . . 193 cps (E type viscometer at 25.degree. C.) and a nonvolatile content of 64% (130.degree. C., one hour), and had **Mn**=1,345, **Mw**=1,990, .alpha.=1.48.

DETDESC:

DETD(98)

A . . . C. for 1.5 hours to obtain a copolymer having a nonvolatile content of 58.6% (130.degree. C., 60 minutes), and had **Mn**=1,870, **Mw**=3,240, .alpha.=1.73.

US PAT NO: 5,409,973 [IMAGE AVAILABLE]

L8: 4 of 19

SUMMARY:

BSUM(11)

The . . . present description and in the claims covers in general all the starches of natural or vegetable origin composed essentially of **amylose** and amylopectin. They can be extracted from various plants, such as, for example, potatoes, rice, tapioca, maize and cereals such. .

SUMMARY:

BSUM(17)

Intrinsic viscosity, [eta]
0.50-0.9
(in DMSO at 30.degree.) preferably 0.65-0.80
Molecular weight distribution **Mw**/**Mn**
1.3-4
(GPC in tetrahydrofuran)
Melting point temperature
<180.degree. C.
preferably 160-170.degree. C.
Hydrolysis degree* 90-99.9%

DETDESC:

DETD(27)

Starch Globe 03401 produced by Cerestar
Starch-A Snowflake 3183 - Cerestar
Starch-B Pea starch with 96% wt **amylose** -
Cerestar (not available on the market)
Starch-C Amisol 05582 (oxydized) - Cerestar
Starch-D Amisol Q TAC 0596 (cationic) . . .

US PAT NO: 5,384,187 [IMAGE AVAILABLE]

L8: 5 of 19

SUMMARY:

BSUM(10)
Molecular weight distribution **Mw**/**Mn** (GPC in tetrahydrofuran):
1.3-4

SUMMARY:

BSUM(48)

The . . . rice starch, legume starch, arrowroot starch, bracken starch, Indian lotus starch, water chestnut starch, etc.; physically modified starch (a-starch, fractionated **amylose**, wet heat-treated starch, etc.), enzymatically modified starch (hydrolyzed dextrin, enzymatically degraded dextrin, **amylose**, etc.); chemically degraded and modified starch (acid-treated starch, hypochlorite-oxidized starch, dialdehyde starch, etc.); chemically modified starch derivatives (esterified starch, etherized) . . .

US PAT NO: 5,378,286 [IMAGE AVAILABLE]

L8: 6 of 19

SUMMARY:

BSUM(105)

VI. GRANULAR **AMYLOSE** TO REPLACE FAT IN FOOD FORMULATIONS

SUMMARY:

BSUM(107)

In . . . and/or oil ingredient comprising replacing at least a substantial portion of said fat and/or oil ingredient with a fragmented granular, **amylose** starch hydrolysate, said hydrolysate being comprised of a major amount of cold-water insoluble hydrolysate and a minor amount of cold-water. . . .

SUMMARY:

BSUM(110)

In . . . food formulation having a reduced level of fat and/or oil comprising a mixture of a foodstuff and a fragmented granular, **amylose** starch hydrolysate, said hydrolysate being comprised of a major amount of cold-water insoluble hydrolysate and a minor amount of cold-water. . . .

DETDESC:

DETD(2)

The . . . highly-branched glucan having alpha-1,4 and alpha-1,6 linkages, denominated amylopectin, and a substantially linear glucan, having almost exclusively alpha-1,4 linkages, denominated **amylose**. Methods of determining the amounts of each are referenced in R. L. Whistler et al., Starch: Chemistry and Technology, pp.. . . .

DETDESC:

DETD(3)

As . . . this term, without further limitations, includes common starches and starches isolated from mutant varieties, e.g., waxy maize starch and high **amylose** corn starch. High **amylose** corn starch is commercially available in native granular form and having an **amylose** content within the range of about 50% to about 80%. For example, native granular starches, one with an **amylose** content of 55% to 60% and the other with about 70%, are available from National Starch and Chemical Corporation, Bridgewater,

DETDESC:

DETD(16)

It . . . be substantially the same as that of the starting amylopectin starch. Given the typical degree of branching of amylopectin and **amylose**, a starch comprised of a major proportion of amylopectin (i.e., greater than 50% by weight of the dry solids of. . . .

DETDESC:

DETD(30)

While . . . fat or oil component. Further, it is contemplated that the combined use of fragmented granular amylopectin starch with fragmented, granular **amylose** starch (e.g., as a blend) may have

certain advantages in many of the compositions described herein. For example, the amylopectin based material may promote a unique consistency while the **amylose** based material provides greater heat stability to the blend.

DETDESC:

DETD(156)

3. Warm the sample and shake to dissolve sample (autoclave, if necessary, with high **amylose** starch hydrolysates, but not all of the sample need dissolve).

DETDESC:

DETD(220)

Molecular
Sample

(hrs.)

(.degree.C.)

(N) Value

(wt. %)

(wt. %)

(Pa)

Weight

Mw

Mn

Mw/**Mn**

1	5.0	56	0.50	1.26	94.3	0.18	--	91,066	106,224	21,297	5.00
---	-----	----	------	------	------	------	----	--------	---------	--------	------

2 20.0 . . .

DETDESC:

DETD(255)

The . . . 3B, which used dent corn starch (pure food product grade, "P") and Run No. 1C, which used a granular high **amylose** starch (HI-SET.TM. C from National Starch and Chemical Co., "H"). In Table I, the `Maximum Variance` column represents the maximum. . . .

DETDESC:

DETD(268)

--	892						
6J	6.10	2	15.3	4.50	580		
7	--	--	--	--	--		

Run No.	Ash (%)	GPM-**Mw**	**Mw**/**Mn**	Protein GPC-PMW (%)
2A	--	--	--	4,150 --
2B	--	--	--	4,150 --

2C

-- -- --

4,000.

DETDESC:

DETD(310)

9.59	12.64	11.39			
Common Corn	4	0	4.50	9.12	14.45
Waxy Maize	81/2	.29	5.13	12.07	14.23
High **Amylose** Corn					11.32
	81/2	.59	10.17	20.63	7.99
High **Amylose**, Powder					7.38
	--	.40	4.85	10.13	19.60
Common Corn, Powder					17.88
	--	.09	5.98	9.13	--
Waxy Maize,	.	.			--

DETDESC:

DETD(311)

2	83.3	13.8	1.7	98.8	
Common Corn	4	8.9	73.4	9.9	92.2
Waxy Maize	81/2	90.7	7.6	1.0	99.3
High **Amylose** Corn					
	81/2	92.5	6.5	0.6	99.6
High **Amylose**, Powder					
	--	96.0	3.4	0.4	99.8
Common Corn, Powder					
	--	66.6	31.3	1.5	99.4
Waxy Maize, Powder	.	.			

DETDESC:

DETD(770)

VI. COMPARATIVE STUDY OF GRANULAR HIGH **AMYLOSE** STARCH HYDROLYSATE,
GRANULAR WAXY MAIZE STARCH TOTAL HYDROLYSATE, AND GRANULAR WAXY MAIZE
STARCH HYDROLYSATE

DETDESC:

DETD(771)

Various . . . filling for snack cakes, and 9) Danish pastry. The ingredients were kept the same in the washed waxy and high **amylose** formulas, but the sugar and salt levels were adjusted, where possible, in the "unwashed" waxy (total hydrolysate) formulas to compensate. . .

DETDESC:

DETD(776)

Example		
47	48	49
Washed	High	Unwashed

Ingredients	Waxy	**Amylose**	Waxy
-------------	------	-------------	------

Washed Waxy Starch			
	25.0	--	--
Hydrolysate, Run No. 5D			
Powder (d.s.)			
High **Amylose** Starch			
	--	25.0	--
Hydrolysate, Run No. 1C			
Powder (d.s.)			
Unwashed Waxy Starch			
	--	--	40.0
Total Hydrolysate, . . .			

DETDESC:

DETD(784)

The high **amylose** dispersion was a slightly brighter white than the waxy dispersion, and had a bitter and rancid flavor. The texture of the high **amylose** dispersion was more rigid than the washed waxy dispersion.

DETDESC:

DETD(786)

Yield stresses of the washed waxy and high **amylose** dispersions (25% d.s.) were 1,737 pascals and 1,824 pascals, respectively, at two days after dispersion production. The yield stress of. . .

DETDESC:

DETD(790)

Ingredients	Example	50 Washed Waxy	51 High **Amylose**	52 Unwashed Waxy
Part A				
Margarine Oil (with antioxidant)	39.82	39.82	39.82	
MYVEROL 18-99 (Eastman)		0.25	0.25	0.25
MYVEROL 18-92. . .	1.20	1.20	0.08	
Distilled Water	17.80	17.80	18.92	
Part C				
Washed Waxy Dispersion (25% d.s.)	40.00	--	--	
High **Amylose** Dispersion (25% d.s.)	--	40.00	--	
Unwashed Waxy Dispersion (40% d.s.)	--	--	40.00	

Total 100.00% 100.00% 100.00% . . .

DETDESC:

DETD(801)

Calculated moisture levels for the table spreads were washed waxy, 47.8%; high **amylose**, 47.8%; and unwashed waxy, 43.0%.

DETDESC:

DETD(804)

High **Amylose**--Flavor had a slightly bitter or rancid aftertaste. The intensity of this undesirable flavor was probably low enough that the product. . .

DETDESC:

DETD(807)

Ingredients	Example			
	53 Washed Waxy	54 High **Amylose**	55 Unwashed Waxy	
Part A				
Margarine Oil	19.82	19.82	19.82	
(with antioxidant)				
MYVEROL 18-99 (Eastman)	0.25	0.25	0.25	
MYVEROL 18-92.	. . .	1.20	1.20	1.20
Distilled Water	17.74	18.94	18.94	
Part C				
Washed Waxy Dispersion	60.00	--	--	
(25% d.s.)				
High **Amylose** Dispersion	--	60.00	--	
(25% d.s.)				
Unwashed Waxy Dispersion	--	--	60.00	
(40% d.s.)				
Total	100.00%	100.00%	100.00%.	. . .

DETDESC:

DETD(820)

Calculated moisture levels for the table spreads were 62.7% for each of the washed waxy and high **amylose** and 54.9% for the unwashed waxy.

DETDESC:

DETD(823)

High **Amylose**--Flavor had a strong bitter and rancid aftertaste which

made the product unacceptable. The texture was firmer and smoother and overall . . . this oil level. The appearance after spreading on hot toast was about the same as for the 40% oil high **amylose** spread. After freezing and thawing, the product lost much oil and had a curdled grainy appearance and texture.

DETDESC:

DETD(828)

Ingredients	Example		
	56 Washed Waxy	57 High **Amylose**	58 Unwashed Waxy
Part A			
ISOSWEET 5500 (A. E. Staley)	27.65	27.65	27.65
Sugar, Powdered 6 times.			
	23.00	23.00	23.00
Water . . .	4.15	4.25	
Emulsifier (SANTONE 3-1-SH)	0.20	0.20	0.20
Part B			
Washed Waxy Dispersion (25% d.s.)	13.80	--	--
High **Amylose** Dispersion (25% d.s.)	--	13.80	--
Unwashed Waxy Dispersion (40% d.s.)	--	--	13.80
Vanilla Extract	0.20	0.20	.

DETDESC:

DETD(835)

The frostings were organoleptically evaluated with the following results. (Formulas were the same for the washed waxy and high **amylose** frostings, but no salt and less sugar were added in the unwashed waxy formulation.)

DETDESC:

DETD(837)

High **Amylose**--Had the best texture among all three frostings; it was short and not stringy. However, the flavor was not as clean. . . .

DETDESC:

DETD(842)

Example

Ingredients	59 Washed Waxy	60 High **Amylose**	61 Unwashed Waxy
Part A			
Water	28.78	28.78	28.78
DELTA .RTM. 7393 SD Starch	2.85	2.85	2.85
(A. E. Staley). . . EDTA	75 ppm	75 ppm	75 ppm
Part B			
Washed Waxy Dispersion	23.00	--	--
(25% d.s.)			
High **Amylose** Dispersion	--	23.00	--
(25% d.s.)			
Unwashed Waxy Dispersion	--	--	23.00
(40% d.s.)			
ISOSWEET 100	21.00	21.00.	.
DETDESC:			
DETD (849)			
The dressings were evaluated with the following results. (Formulas were the same for washed waxy and high **amylose** dressings, but less salt and corn syrup were added to the dressing containing unwashed hydrolysate to compensate for the additional. . . .			
DETDESC:			
DETD (851)			
High **Amylose**--Had a short and smooth texture. However, the mouthfeel and flavor were not as good as that of the one made. . . .			
DETDESC:			
DETD (856)			
Example			
Ingredients	62 Washed Waxy	63 High **Amylose**	64 Unwashed Waxy
Water	36.25	36.25	40.80
ISOSWEET 100	25.00	25.00	22.00
(A. E. Staley)			
Washed Waxy Dispersion	22.00	--	--
(25% d.s.)			
High **Amylose** Dispersion	--	22.00	--
(25% d.s.)			

Unwashed Waxy Dispersion -- -- 23.00

(40% d.s.)

Vinegar (white, 100 grain) . . .

DETDESC:

DETD(865)

Viscosity
Dispersion (Brookfield RV #4, 20 rpm)

Washed Waxy 4,150 cps
High **Amylose** 3,700 cps
Unwashed Waxy 3,200 cps

DETDESC:

DETD(866)

Washed waxy and high **amylose** formulas were the same, but less corn syrup and salt were added in the unwashed waxy dressing to compensate for. . .

DETDESC:

DETD(868)

High **Amylose***-Mouthfeel was very close to that of the one made with washed waxy hydrolysate. The texture seemed to be heavier than. . .

DETDESC:

DETD(873)

Ingredients	Example		
	65 Washed Waxy	66 High **Amylose**	67 Unwashed Waxy
<hr/>			
Bittermilk (1%, Dean Foods)			
	30.00	30.00	30.00
Water	27.28	27.28	27.78
Washed Waxy Dispersion	20.00	--	--
(25% d.s.)			
High **Amylose** Dispersion	--	20.00	--
(25% d.s.)			
Unwashed Waxy Dispersion	--	--	20.00
(40% d.s.)			
Vinegar (white, 100 grain) . . .			

DETDESC:

DETD(882)

Viscosity
Dispersion (Brookfield RV #4, 20 rpm)

Washed Waxy 6,000 cps
High **Amylose** 5,750 cps
Unwashed Waxy 3,200 cps

DETDESC:

DETD(883)

The dressings were organoleptically evaluated with the following results. (Formulas were the same for washed waxy and high **amylose** dressings, but were slightly modified for the unwashed waxy. Less sugar and no salt were added to the unwashed waxy. . . .

DETDESC:

DETD(885)

High **Amylose**--Strong rancid off flavor, smooth but slightly gelling texture although the viscosity is lower than that of the waxy version.
Mouthfeel. . . .

DETDESC:

DETD(890)

Ingredients	Example		
	68 Washed Waxy	69 High **Amylose**	70 Unwashed Waxy
Part A			
Water	29.62	29.63	29.63
Non-Fat Dry Milk	5.42	5.42	5.42
5.0% Solution, #08031	0.15	0.15.	. . .
(A. E. Staley) Salt, Flour	0.32	0.32	0.32
Part C			
Washed Waxy Dispersion	39.30	--	--
(25% d.s.)			
High **Amylose** Dispersion	--	39.30	--
(25% d.s.)			
Unwashed Waxy Dispersion	--	--	39.30
(40% d.s.)			
Part D			
Lactic Acid, . . .			

DETDESC:

DETD(899)

High **Amylose**--This spread had a strong off flavor which made it unacceptable. The texture of this spread was smoother, creamier, and preferred. . .

DETDESC:

DETD(904)

Ingredients	Example		
	71 Washed Waxy	72 High	73 Unwashed **Amylose** Waxy
Part A			
Cream Cheese	24.24	24.24	24.24
Washed Waxy Dispersion			
	36.00	--	--
(25% d.s.)			
High **Amylose** Dispersion		36.00	--
(25% d.s.)			
Unwashed Waxy Dispersion	--	--	36.00

Part B

NETO .RTM. 7300 (A... . . .

DETDESC:

DETD(914)

High **Amylose**--Thickest before bake and after bake. Texture firm and somewhat cheese-like and unacceptable. The flavor was different, but acceptable.

DETDESC:

DETD(919)

Ingredients	Example		
	74 Washed Waxy	75 High	76 Unwashed **Amylose** Waxy
Part A			
Polydextrose N, 70%	14.30	14.30	14.30
Solution			
ISOSWEET .RTM. 5500 HFCS			
	10.00	10.00	10.00. . .
Butter and Vanilla Flavor			
	0.40	0.40	0.40

#18 (Consumers)
Washed Waxy Dispersion

23.01 -- --

(25% d.s.)

High **Amylose** Dispersion
-- 23.01 --

(25% d.s.)

Unwashed Waxy Dispersion
-- -- 23.41

(40% d.s.)

Part B
BETRACING 6.00. . .

DETDESC:

DETD(928)

High **Amylose**--Thicker than waxy. The consistency and texture were preferred over the unwashed and washed waxy.

DETDESC:

DETD(933)

Ingredients	Example		
	77 Washed Waxy	78 High **Amylose**	79 Unwashed Waxy
<hr/>			
Part A - Dough Stage			
All Purpose Flour,	39.424	39.424	39.424
4.times. Patent (Pillsbury)			
Vital Wheat Gluten. . . --			
(A. E. Staley)			
Potassium Sorbate	0.02	0.02	0.02
Washed Waxy Dispersion	5.09	--	--
(25% d.s.)			
High **Amylose** Dispersion	--	5.09	--
(25% d.s.)			
Unwashed Waxy Dispersion	--	--	5.14
(40% d.s.)			
DUR-LO (Van Den 1.00. . .			

DETDESC:

DETD(954)

All roll-in formulas were produced on the MICROFLUIDIZER. The washed waxy and high **amylose** both contained a 50/50 blend of water and HFCS for the liquid portion of the roll-in. Because of the soluble. . .

DETDESC:

DETD(956)

Washed Waxy--This product exhibited good texture and a much longer shelf life than the high **amylose**. It was tender even up to 14 days with no flavor problems.

DETDESC:

DETD(957)

High **Amylose**--This product was similar to a standard Danish in its shelf life characteristics. It only lasted about 5 days. There were. . .

CLAIMS:

CLMS(11)

11. A method of claim 1 wherein said granular starch is an **amylose** starch.

US PAT NO: 5,372,835 [IMAGE AVAILABLE]

L8: 7 of 19

SUMMARY:

BSUM(7)

U.S. . . . of the alpha-1,6-D-glucosidic bonds of the starch, comprising amylopectin, partially debranched amylopectin and up to 80% by weight, short chain **amylose** and that the partially debranched starch is useful in a variety of ways depending upon the degree of debranching. It. . . . that a waxy maize starch (or other waxy starch) can be partially debranched (i.e. to 25% to 70% short chain **amylose**) to yield sufficient short chain **amylose** to form a thermally reversible gel in an aqueous starch suspension. It is further disclosed that the same degree of. . . .

SUMMARY:

BSUM(11)

(b) . . . are present, said debranching being effective to convert more than about 80% by weight of the amylopectin to short chain **amylose** and form a debranched amylopectin starch in said medium;

SUMMARY:

BSUM(22)

The . . . glucan having alpha-1,4 and alpha-1,6 linkages, denominated amylopectin, and a substantially linear glucan, having almost exclusively alpha-1, 4 linkages, denominated **amylose**. Methods of determining the amounts of each are referenced in R. L. Whistler et al., Starch: Chemistry and Technology, pp. . . . waxy maize. Common corn starch and waxy maize starch, both of which are examples of starches containing less than 40% **amylose**, are useful herein. However, starches containing a major amount of **amylose** (e.g. 50% to 75% by weight) are also useful and may be preferred depending upon the precise properties desired in the

final product. Examples of such starches from high **amylose** corn include HI-SET.RTM. C and HYLON.TM. (each about 55% **amylose** by weight) and HYLON.TM. VII (about 70% **amylose** by weight), all available from National Starch and Chemical Corporation, Bridgewater, N.J.

SUMMARY:

BSUM(23)

In . . . variety of native starch which consists essentially of amylopectin or is amylopectin derived from a native starch variety containing both **amylose** and amylopectin. Methods for the fractionation of **amylose** and amylopectin from native starch are disclosed in, for example, U.S. Pat. No. 3,067,067 (Etheridge).

SUMMARY:

BSUM(27)

The debranching enzyme preparation should be as specific as possible for the hydrolysis of the 1,6-glucosidic bond of amylopectin and **amylose**. Thus, the enzyme preparation, if it contains a mixture of enzymes, is preferably essentially free of enzymes capable of hydrolyzing. . . .

SUMMARY:

BSUM(32)

The . . . degree of debranching is sufficient to convert more than about 80% of the amylopectin in the starch to short chain **amylose** and, more preferably, at least about 90% of the amylopectin. In preferred embodiments, essentially all of the amylopectin is converted to short chain **amylose**. The amount of short chain **amylose** can be measured by gel permeation chromatography as set forth in U.S. Pat. No. 4,971,723, wherein short chain **amylose** is calculated from the relative area of the peak obtained within the molecular weight range of 500 to 20,000. Thus, . . . essentially no amylopectin having a molecular weight in excess of 20,000 g/mol will remain. (It should be noted that if **amylose** is present, at least a portion thereof may be debranched to produce molecules above the 20,000 g/mol cut-off and molecules. . . . how much of the material eluting between 500 g/mol and 20,000 g/mol is debranched amylopectin and how much is debranched **amylose**; it may be necessary to fractionate the starting starch into its **amylose** and amylopectin fractions and then debranch and elute each fraction separately.)

SUMMARY:

BSUM(45)

Analysis . . . the starch has a measurable crystallinity. The crystalline regions of particles derived from fully debranched waxy maize starch (essentially no **amylose** component) exhibit a diffraction pattern characteristic of a starch material consisting essentially of A-type starch crystals. The crystalline regions of particles derived from substantially fully debranched common corn starch (about 28% **amylose**) exhibit a diffraction pattern characteristic of a starch material

consisting essentially of B-type starch crystals.

DETDESC:

DETD (4)

Defatted 55% **amylose** and 70% **amylose** corn starches were each slurried at 1-2% d.s. in 0.1N NaCO₃ buffer (at pH 7.0). The slurries were solubilized by. . .

DETDESC:

DETD (5)

Starch	**Mw**	**Mn**	**Mw**/**Mn**	M Peaks
55% **Amylose**	31,845	5,542	5.8	65,000; 7,033; 3,169
70% **Amylose**	47,085	7,384	6.5	92,000; 8,262; 3,367

DETDESC:

DETD (8)

Starch	Hrs.	**Mw**	**Mn**	**Mw**/**Mn**	M Peaks
55%	24	62,400	6,157	10.1	106,000; 7,260; 2,930
Amylose	48	49,900	5,782	7.6	88,000; 7,242; 3,269
	72	32,924	5,422	6.1	65,000; 7,033; 3,169
70%	24	93,000	7,428	12.6	73,100; 2,142
Amylose	48	85,600	7,058	12.1	81,200; 2,216
	72	54,217	7,573	7.2	84,000; 8,262; 3,369

CLAIMS:

CLMS (1)

What . . . are present, said debranching being effective to convert more than about 80% by weight of the amylopectin to short chain **amylose** and form a debranched amylopectin starch in said medium;
(c) ceasing the production of ultrasonic waves in the debranching medium and. . .

CLAIMS:

CLMS (6)

6. . . . method of claim 1 wherein said debranched amylopectin starch is composed of more than about 80% by weight short chain **amylose**.

US PAT NO: 5,368,840 [IMAGE AVAILABLE]

L8: 8 of 19

DETDESC:

DETD (3)

Exemplary . . . methoxy pectin denoting pectin in which 40% or more of the carboxylic acid groups are esterified and/or amidated), pectic acid, **amylose**, pullulan, glycogen, amylopectin, cellulose, carboxymethylcellulose, hydroxypropyl methylcellulose, dextran, pustulan, chitin, agarose, keratan, chondroitin, dermatan, hyaluronic acid and alginic acid, and. . .

DETDESC:

DETD (63)

and Polygalacturonic Acids With Mn(II)
Sample R1 R2

Decagalacturonic

35.33	.+-.	0.62	
		61.02 .+-.	0.89

Acid and **Mn** (II)

Low **MW**	46.11	.+-.	0.35	
			67.98 .+-.	1.26

Polygalacturonic

Acid and Mn(II)

40%	42.62	.+-.	0.29	
			67.28 .+-.	0.46

Decagalacturonic. . .

Acid and

60% High MW

Polygalacturonic

Acid and Mn(II)

Low Methoxy	16.53	.+-.	0.88	
			36.53 .+-.	0.69

Pectin and **Mn** (II)

High **MW**	28.99	.+-.	0.04	
			55.32 .+-.	1.11

Polygalacturonic

Acid and Mn(II)

CLAIMS:

CLMS (9)

9. . . . from the group consisting of arabinans, fructans, fucans, galactans, galacturonans, glucans, mannans, xylans, levan, fucoidan, carrageenan, galactocarolose, pectin, pectic acid, **amyloser** pullulan, glycogen, amylopectin, cellulose, carboxymethylcellulose,

hydroxypropylmethylcellulose, dextran, pustulan, chitin, agarose, keratan, chondroitin, dermatan, hyaluronic acid, alginic acid, and polysaccharides containing. . .

CLAIMS:

CLMS (38)

38. . . . from the group consisting of arabinans, fructans, fucans, galactans, galacturonans, glucans, mannans, xylans, levan, fucoidan, carrageenan, galactocarolose, pectin, pectic acid, **amylose**, pullulan, glycogen, amylopectin, cellulose, carboxylmethylcellulose, hydroxypropylmethylcellulose, dextran, pustulan, chitin, agarose, keratan, chondroitin, dermatan, hyaluronic acid, alginic acid, and polysaccharides containing. . .

CLAIMS:

CLMS (65)

65. . . . from the group consisting of arabinans, fructans, fucans, galactans, galacturonans, glucans, mannans, xylans, levan, fucoidan, carrageenan, galactocarolose, pectin, pectic acid, **amylose**, pullulan, glycogen, amylopectin, cellulose, carboxylmethylcellulose, hydroxypropylmethylcellulose, dextran, pustulan, chitin, agarose, keratan, chondroitin, dermatan; hyaluronic acid, alginic acid, and polysaccharides containing. . .

US PAT NO: 5,364,652 [IMAGE AVAILABLE]

L8: 9 of 19

SUMMARY:

BSTU(8)

Further . . . Chemistry & Technology, Vol. 1, 430 (965) makes reference to analyzed values of linkage types constituting heat-treated amylopectin and heat-treated **amylose** which were obtained by separating corn starch into amylopectin and **amylose** fractions and individually heating the fractions with addition of an acid. The analyzed values were obtained for the heat-treated fractions. . .

SUMMARY:

BSTU(36)

The . . . weight average molecular weight as MW, and the ratio of weight average molecular weight to number average molecular weight as **MW**/**MN**. Glucose residues having a 1.fwdarw.4 linkage only will be expressed as "glucose residues having a 1.fwdarw.4 linkage," and similar expressions. . .

SUMMARY:

BSTU(82)

3. Method of Determining **MN** and **MW**

SUMMARY:

BSUM(91)

MN and **MW** are calculated from the following equations based on the result of chromatography. ##EQU1## where Hi: height of peak

SUMMARY:

BSUM(160)

To . . . to determine the contents of glucose, various glycosidic linkages, indigestible component and dietary fiber, caloric value 1, caloric value 2, **MN** and **MW**. Detected by this procedure were a glucose residue at each nonreducing end, glucose residues having a 1.fwdarw.4 linkage, glucose residues. . .

SUMMARY:

BSUM(162)

3.27	2.97	2.70	2.35	2.17	
MN	1789	1972	1588	1452	1487
MW .times. 10.sup.-3	683	642	553	551	547
MW/**MN**	382	326	348	379	368

SUMMARY:

BSUM(163)

With . . . with 1.fwdarw.4 linkage decreases in inverse proportion to the heating time. The values MN decrease and increase during heating and **MW**/**MN** decrease during heating for 30 minutes and increase again in proportion to the heating time after 60 minutes. These variations. . .

SUMMARY:

BSUM(165)

2 . . . Example 1. Table 5 shows the values obtained. The hydrolyzate obtained before the addition of glucoamylase was also checked for **MN**, **MW** and **MW**/**MN**. Table 6 shows the results.

SUMMARY:

BSUM(166)

3.27	3.09	2.80	2.47	2.34	
MN	107	144	139	185	148
MW .times. 10.sup.-3	1.47	1.42	2.09	20.2	44.3
MW/**MN**	13.7	9.86	15.0	109	299

SUMMARY:

BSUM(167)

30 60 120 180

MN	784	737	802	890	850
MW .times. 10.sup.-3	31.4	29.8	97.6	157	136
MW/**MN**	40.1	40.4	122	176	160

SUMMARY:

BSUM(173)

5) The ratio **MW**/**MN**, which is about 10 to about 300, is exceedingly greater than the corresponding value of the prior art which is. . .

SUMMARY:

BSUM(174)

Table 6 reveals that the hydrolyzates before being hydrolyzed with glucoamylase were as high as about 40 to about 180 in **MW**/**MN**.

SUMMARY:

BSUM(179)

1.48	1.44	1.33	1.17	1.24	
MN	533	678	756	962	896
MW .times. 10.sup.-3	8.26	17.6	25.8	43.8	90.4
MW/**MN**	15.5	26.0	34.1	45.5	101
Theoretical yield (%)	30.8	39.0	47.5	62.6	56.7

-

SUMMARY:

BSUM(180)

With . . . theoretical yield, which corresponds to the proportions of indigestible component, dietary fiber and low calorie component, increases in proportion to **MN**, **MW** and **MW**/**MN**. The table further reveals that the theoretical yield increases to at least about 40% when **MW**/**MN** is at least 25. This indicates that the hydrolyzate before the separation of the glucose fraction by the ion exchange. . .

SUMMARY:

BSUM(264)

(2) . . . with conventional pyrodextrins which are at least 1450. The theoretical yield is at least about 39% in the case where **MW**/**MN** is at least 25. The contents of indigestible component and dietary

fiber increase in proportion to the value **MW**/**MN**, and the caloric value decreases in inverse proportion thereto.

DETDESC:

DETD(14)

The . . . MN as actually measured, MN as calculated from Equation 1, variation of the calculated value from the measured value and **MW**/**MN**. The results are collectively listed in Table 20, which also shows the whiteness of each pyrodextrin.

DETDESC:

DETD(16)

value	778	852	513	438
Difference between calculated	+9.3			
	+8.7			
	-6.5			
	-16.9			
value and measurement (%)				
MW/**MN**		62.4		
	54.3			
	46.7			
	42.1			
Whiteness (%)	40.6			
	45.6			
	47.3			
	51.7			

—
US PAT NO: 5,360,830 [IMAGE AVAILABLE]

L8: 10 of 19

SUMMARY:

BSUM(15)

Intrinsic viscosity 0.50-0.90
(in DMSO at 30.degree. C.) preferably 0.65-0.80
Molecular weight distribution **Mw**/**Mn**
1.3-4
(GPC in tetrahydrofuran)
Melting point temperature
180.degree. C.
preferably 160-170.degree. C.
Hydrolysis degree* 90-99.9%

SUMMARY:

BSUM(18)

The starch which is used comprises in general all the starches of a natural or vegetable origin composed essentially of **amylose** and/or amylopectin. They can be extracted from various plants such as, for example, potatoes, rice, tapioca, and maize, and from.

US PAT NO: 5,334,634 [IMAGE AVAILABLE]

L8: 11 of 19

SUMMARY:

BSUM(16)

Intrinsic viscosity, [.eta.]
0.50-0.9
(in DMSO at 30.degree. C.
preferably 0.65-0.80
Molecular weight distribution **Mw**/**Mn**
1.3-4
(GPC in tetrahydrofuran)
Melting point temperature
<180.degree. C.
preferably 160-170.degree. C.
Hydrolysis degree* 90-99.9%

SUMMARY:

BSUM(18)

The . . . the present description and in the claims, generally covers all the starches of natural or vegetable origin composed essentially of **amylose** and/or amylopectin. They can be extracted from various plants, such as, for example, potatoes, rice, tapioca, maize and cereals such. . .

DETDESC:

DETD(33)

42 38 38 38 44 44
(mol. %)
Intrinsic viscosity
0.79 0.67 0.67 0.67 0.77 0.77
(DMSO, 30.degree. C.)
Mw/**Mn** 3.6 1.7 1.7 1.7 1.7 1.7
Melting temperature
164 179 169 176 166 162
.degree.C.)
Hydrolysis degree
99.3. . .

US PAT NO: 5,288,765 [IMAGE AVAILABLE]

L8: 12 of 19

SUMMARY:

BSUM(10)

Intrinsic viscosity, 0.50-0.9
(in DMSO at 30.degree. C.)
preferably 0.65-0.80
Molecular weight distribution
1.3-4
Mw/**Mn**
(GPC in tetrahydrofuran)
Melting point temperature 180.degree. C.
preferably 160-170.degree. C.
Hydrolysis degree* 90-99.9%

*Basic hydrolysis and. . .

SUMMARY:

BSUM(12)

The starch which is used comprises in general all the starches of a natural or vegetable origin, composed essentially of **amylose** and/or amylopectin. They can be extracted from various plants such as, for example, potatoes, rice, tapioca, maize and cereals such. . .

US PAT NO: RE 34,457 [IMAGE AVAILABLE]

L8: 13 of 19

SUMMARY:

BSUM(46)

The . . . the compounds used in the present invention may be conducted by a known process for the esterification of cellulose or **amylose** (see, for example, "Dai-Yuki Kagaku" 19, 'Tennen Kobunshi Kagaku I' published by Asakura Book Store, p. 124, reference 1). Common.

DETDESC:

DETD(28)

140 . . . by an ordinary homogeneous acetylation process (number-average degree of polymerization as determined by vapor pressure osmometry: 110; molecular weight distribution **Mw**/**Mn**=2.45, free hydroxyl group content: 0.35%) was swollen in 1.4 l of acetic acid (a guaranteed reagent of Kanto Kagaku Co.) . . .

US PAT NO: 5,248,749 [IMAGE AVAILABLE]

L8: 14 of 19

SUMMARY:

BSUM(31)

Typical . . . diol, cyclooctane diol, cyclopentane diol, decalin diol, decane diol, ethylene glycol, propylene glycol, dihydroxyacetophenone, dihydroxyanthraquinone, dihydroxybenzophenone, hydroxybenzylalcohol, catechol, pentaerythritol, glycerol, **amylose**, lactose, sucrose, manitol, maltose and the like.

DETDESC:

DETD(36)

A . . . for 30 minutes. It was mixed with heating for 1.5 hours and cooled to obtain transparent and light yellow polymer (**Mn**=14,200, **Mw**=37,500, .alpha.=2.63).

DETDESC:

DETD(38)

A . . . for 30 minutes. It was mixed with heating for 1.5 hours and cooled to obtain transparent and light yellow polymer (**Mn**=9,730, **Mw**=30,942, .alpha.=3.17).

DETDESC:

DETD(40)

A . . . for 30 minutes. It was mixed with heating for 1.5 hours and cooled to obtain transparent and light yellow polymer (**Mn**=2,799, **Mw**=5,695, .alpha.=2.03).

DETDESC:

DETD(42)

A . . . for 30 minutes. It was mixed with heating for 1.5 hours and cooled to obtain transparent and light yellow polymer (**Mn**=8,050, **Mw**=17,240, .alpha.=2.14).

DETDESC:

DETD(54)

A . . . for 30 minutes. It was mixed with heating for 1.5 hours and cooled to obtain transparent and light yellow polymer (**Mn**=8,870, **Mw**=20,600, OH value=100, .alpha.=2.31).

DETDESC:

DETD(81)

A . . . cps .degree.C. (E type viscometer at 25.degree. C.) and a nonvolatile content of 50% (130.degree. C., one hour), and had **Mn**=6,790, **Mw**=13,300, .alpha.=1.96.

DETDESC:

DETD(88)

A . . . 83 cps (E type viscometer at 25.degree. C.) and a nonvolatile content of 49% (130.degree. C., one hour), and had **Mn**=4,800, **Mw**=10,090, .alpha.=2.10.

DETDESC:

DETD(95)

A . . . 193 cps (E type viscometer at 25.degree. C.) and a nonvolatile content of 64% (130.degree. C., one hour), and had **Mn**=1,345, **Mw**=1,990, .alpha.=1.48.

DETDESC:

DETD(103)

A . . . C. for 1.5 hours to obtain a copolymer having a nonvolatile content of 58.6% (130.degree. C., 60 minutes), and had **Mn**=1,870, **Mw**=3,240, .alpha.=1.73.

US PAT NO: 5,247,013 [IMAGE AVAILABLE]

L8: 15 of 19

DETDESC:

DETD(10)

The . . . ribose, xylose, erythrose, fructose, ribulose, and glycerose; oligosaccharides such as sucrose, cellobiose, trehalose, dextrin, cyclodextrin and raffinose; polysaccharides such as **amylose**, dextran, starch, pullulan, cellulose and galactan ; deoxysaccharides such as deoxyribose, aminosaccharides such as glucosamine ; thiosaccharides such as thioglucose. . .

DETDESC:

DETD(36)

Molecular weight distribution of the polymer was estimated by the ratio **Mw**/**Mn**.

DETDESC:

DETD(91)

0.020

0.053	0.003			
180	4	28.4		
			54000	
			176	insoluble
			65	

Example 7

lactide

amylose

0.020

0.053	0.003			
180	4	18.1		
			14000	

163, 174
partly
--*.sup.3)
soluble. . .

DETDESC:

DETD(92)

Monomer	(wt %)	(mol %)	(.degree.C.)	(hr)	Yield		viscosity hydrolysis
					(%)	viscosity	
					Mn*.sup.1)		
					Mw/**Mn**		
					(poise)		
					for 5		

weeks

Ex- glycolide							
	sucrose						
		0.062*.sup.2)					
		0.003					
			180	4	77.3		

US PAT NO: 5,169,896 [IMAGE AVAILABLE] L8: 16 of 19

SUMMARY:

BSUM(30)

Typical . . . diol, cyclooctane diol, cyclopentane diol, decalin diol, decane diol, ethylene glycol, propylene glycol, dihydroxyacetophenone, dihydroxyanthraquinone, dihydroxybenzophenone, hydroxybenzylalcohol, catechol, pentaerythritol, glycerol, **amylose**, lactose, sucrose, manitol, maltose and the like.

DETDESC:

DETD(35)

A . . . for 30 minutes. It was mixed with heating for 1.5 hours and cooled to obtain transparent and light yellow polymer (**Mn**=14,200, **Mw**=37,500, .alpha.=2.63).

DETDESC:

DETD(37)

A . . . for 30 minutes. It was mixed with heating for 1.5 hours and cooled to obtain transparent and light yellow polymer (**Mn**=9,730, **Mw**=30,942, .alpha.=3.17).

DETDESC:

DETD(39)

A . . . for 30 minutes. It was mixed with heating for 1.5 hours and cooled to obtain transparent and light yellow polymer (**Mn**=2,799, **Mw**=5,695, .alpha.=2.03).

DETDESC:

DETD(41)

A . . . for 30 minutes. It was mixed with heating for 1.5 hours and cooled to obtain transparent and light yellow polymer (**Mn**=8,050, **Mw**=17,240, .alpha.=2.14).

DETDESC:

DETD(53)

A . . . for 30 minutes. It was mixed with heating for 1.5 hours and cooled to obtain transparent and light yellow polymer (**Mn**=8,870, **Mw**=20,600, OH value=100, .alpha.=2.31).

DETDESC:

DETD(80)

A . . . cps .degree.C. (E type viscometer at 25.degree. C.) and a nonvolatile content of 50% (130.degree. C., one hour), and had **Mn**=6,790, **Mw**=13,300, .alpha.=1.96.

DETDESC:

DETD(87)

A . . . 83 cps (E type viscometer at 25.degree. C.) and a nonvolatile content of 49% (130.degree. C., one hour), and had **Mn**=4,800, **Mw**=10,090, .alpha.=2.10.

DETDESC:

DETD(94)

A . . . 193 cps (E type viscometer at 25.degree. C.) and a nonvolatile content of 64% (130.degree. C., one hour), and had **Mn**=1,345, **Mw**=1,990, .alpha.=1.48.

DETDESC:

DETD(102)

A . . . C. for 1.5 hours to obtain a copolymer having a nonvolatile content of 58.6% (130.degree. C., 60 minutes), and had **Mn**=1,870, **Mw**=3,240, .alpha.=1.73.

US PAT NO: 5,117,044 [IMAGE AVAILABLE]

L8: 17 of 19

SUMMARY:

BSUM(29)

Typical . . . diol, cyclooctane diol, cyclopentane diol, decalin diol, decane diol, ethylene glycol, propylene glycol, dihydroxyacetophenone, dihydroxyanthraquinone, dihydroxybenzophenone, hydroxybenzylalcohol, catechol, pentaerythritol, glycerol, **amylose**,

lactose, sucrose, manitol, maltose and the like.

DETDESC:

DETD(35)

A . . . for 30 minutes. It was mixed with heating for 1.5 hours and cooled to obtain transparent and light yellow polymer (**Mn**=14,200, **Mw**=37,500, .alpha.=2.63).

DETDESC:

DETD(37)

A . . . for 30 minutes. It was mixed with heating for 1.5 hours and cooled to obtain transparent and light yellow polymer (**Mn**=9,730, **Mw**=30,942, .alpha.=3.17).

DETDESC:

DETD(39)

A . . . for 30 minutes. It was mixed with heating for 1.5 hours and cooled to obtain transparent and light yellow polymer (**Mn**=2,799, **Mw**=5,695, .alpha.=2.03).

DETDESC:

DETD(41)

A . . . for 30 minutes. It was mixed with heating for 1.5 hours and cooled to obtain transparent and light yellow polymer (**Mn**=8,050, **Mw**=17,240, .alpha.=2.14).

DETDESC:

DETD(53)

A . . . for 30 minutes. It was mixed with heating for 1.5 hours and cooled to obtain transparent and light yellow polymer (**Mn**=8,870, **Mw**=20,600 OH value=100, .alpha.=2.31).

DETDESC:

DETD(80)

A . . . cps .degree.C. (E type viscometer at 25.degree. C.) and a nonvolatile content of 50% (130.degree. C., one hour), and had **Mn**=6,790, **Mw**=13,300, .alpha.=1.96.

DETDESC:

DETD(87)

A . . . 83 cps (E type viscometer at 25.degree. C.) and a nonvolatile content of 49% (130.degree. C., one hour), and had **Mn**=4,800, **Mw**=10,090, .alpha.=2.10.

DETDESC:

DETD(94)

A . . . 193 cps (E type viscometer at 25.degree. C.) and a nonvolatile content of 64% (130.degree. C., one hour), and had **Mn**=1,345, **Mw**=1,990, .alpha.=1.48.

DETDESC:

DETD(102)

A . . . C. for 1.5 hours to obtain a copolymer having a nonvolatile content of 58.6% (130.degree. C., 60 minutes), and had **Mn**=1,870, **Mw**=3,240, .alpha.=1.73.

US PAT NO: 5,070,122 [IMAGE AVAILABLE]

L8: 18 of 19

DETDESC:

DETD(13)

Polysaccharides contemplated for use in the practice of the present invention are materials comprised of linear (i.e., **amylose**) and branched (i.e., amylopectin) polymers of alpha-D-glucopyranosyl units. Such polysaccharide materials can be derived from corn, wheat, rice, tapioca, potato, . . .

DETDESC:

DETD(59)

TABLE VI

Gel Permeation Chromatography of Variously Treated Specimens of Sample No. 29
Sample Exposure

	Mw	**Mn**	**Mw**/**Mn**
None	137925	15223	9.1
Fungal	143644	15097	9.5
Weather-Ometer	140415	14040	10.0

DETDESC:

DETD(60)

A . . . are assimilated by the fungi. After one day Weather-Ometer exposure a decrease in lower molecular weight species was observed (i.e., **Mw**/**Mn** increased).

US PAT NO: 4,818,394 [IMAGE AVAILABLE]

L8: 19 of 19

SUMMARY:

BSUM(46)

The . . . the compounds used in the present invention may be conducted by a known process for the esterification of cellulose or **amylose** (see, for example, "Dai-Yuki Kagaku" 19, `Tennen Kobunshi Kagaku I` published by Asakura Book Store, p. 124, reference 1). Common.

DETDESC:

DETD(28)

140 . . . by an ordinary homogeneous acetylation process (number-average degree of polymerization as determined by vapor pressure osmometry: 110; molecular weight distribution $^{**M_w**}/^{**M_n**}=2.45$, free hydroxyl group content: 0.35%) was swollen in 1.4 l of acetic acid (a guaranteed reagent of Kanto Kagaku Co.) . . .
=>